Safety Maintenance and Production

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FIFTY CENTS NOVEMBER, 1952

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2 Frontal and side protection against flying particles when chipping, grinding, polishing, riveting, spot welding, hand nailing . . . on machine, hand tool and woodworking operations . . . when operating tumblers, sand and shot blast machines (Clear 6 Curve Super Armorplate Lenses *with* Side Shields)

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American Optical

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SOUTHBRIDGE, MASSACHUSETTS • BRANCHES IN PRINCIPAL CITIES

(For further details, use Key # L-1 on free Inquiry Card on page 69)

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H-767

H-414

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DIVISION OF INTERNATIONAL SHOE COMPANY

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To be sure of the Genuine Steel Grip INDUSTRIAL Safety Apparel TRADE-MARK *Demand this Trade Mark*

(Use Key # L-3 on Inquiry Card on page 69)

THE Future SHOWS

New York, N. Y. *Nov. 9–13*

Eighty-first Annual American Public Health Association Meeting (Hotels Statler & New Yorker). Dr. Reginald M. Atwater, Executive Secretary, 1790 Broadway, New York, N. Y.

Cincinnati, Ohio *Nov. 17–18*

Third annual Greater Cincinnati Safety Conference. (Sheraton-Gibson Hotel.) Kenneth R. Miller, executive director, Greater Cincinnati Safety Council, 1203 Federal Reserve Bank Bldg., Cincinnati 2, Ohio.

Fort Worth, Texas *Nov. 19*

Ninth Annual Fort Worth Industrial Safety Conference (Hotel Texas). L. W. Graff, safety director, Ft. Worth Safety Council, Majestic Bldg., Ft. Worth, Texas.

New Orleans, La. *Dec. 7–8*

Louisiana Safety Conference (Roosevelt Hotel). Charles E. Doerler, conference secretary, Caddo Bossier Safety Council, Inc., 610 Edwards St., Box 806, Shreveport, La.

Milwaukee, Wis. *Jan. 18–19*

Twelfth Annual Mid-Winter Wisconsin Safety Conference & Exposition (Hotel Schroeder).

Chicago, Ill. *Jan. 25–28*

Plant Maintenance & Engineering Show (International Amphitheater). Clapp & Poliak, Inc., 341 Madison Ave., New York 17, N. Y.

Dayton, Ohio *Feb. 10*

Second Annual Miami Valley Safety Conference (Biltmore Hotel). Marvin Purk, Dayton Chamber of Commerce, Biltmore Hotel, Dayton 2, Ohio.

Philadelphia, Pa. *March 10–11*

Twentieth Annual Philadelphia Regional Safety and Fire Conference and Exhibit (Bellevue-Stratford Hotel). Walter W. Matthews, Managing Director, Philadelphia Chamber of Commerce Safety Council, Architects Building, 17th and Samson Streets, Philadelphia 3, Pa.

Indianapolis, Ind. *March 17–18*

Seventh Annual Central Indiana Safety Conference and Exhibit (Claypool Hotel). Indianapolis Safety Council, 320 North Meridian St., Indianapolis 11, Ind.

Pittsburgh, Pa. *March 30–31*

Twenty-ninth Annual Western Pennsylvania Safety Conference and Exhibition (Hotel William Penn). Harry H. Brainerd, Executive Manager, Western Pennsylvania Safety Council, 605 Park Bldg., Pittsburgh 22, Pa.

New York, N. Y. *April 6–9*

Twenty-fourth Greater New York Safety Convention and Exposition (Hotel Statler). George E. Decker, Lincoln Building, 60 East 42nd St., New York 17, N. Y.

Detroit, Mich. *April 26–28*

Michigan State Safety Conference (Sheraton Cadillac Hotel). Jerry Moore, executive secretary, Corporate Service, Inc., Detroit, Michigan.

Raleigh, North Carolina *May 4–6*

Twenty-fourth Annual North Carolina Statewide Industrial Safety Conference (Sir Walter Hotel). H. S. Baucom, Safety Director, North Carolina Industrial Commission, Raleigh, North Carolina.

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are better than anything they've ever used for most industrial wiping jobs.

We expected that years of testing and research had made this a good product. Still, we never thought that Scott Industrial Wipers would catch on so quickly with so many key men in so many different kinds of plants.

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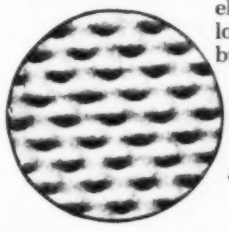

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SM-A

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Company_____

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(For further details, use Key # L-4 on free Inquiry Card on page 69)

MODEL E (HAT)

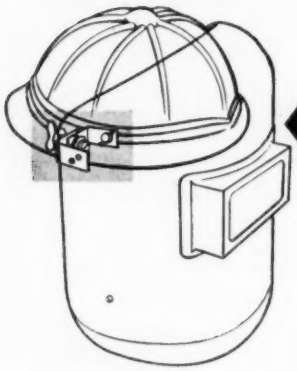
NOW! ADDITIONAL DAVIS HEDGARD FEATURES

For greater safety . . . greater convenience

LOCK-CLIP HEAD CRADLE

Davis announces a new, 6-point suspension head cradle . . . easily adjusted to fit any head. Stainless steel, rust proof lock-clips save replacement time in the field. Cradle may be removed or replaced in 30 seconds. Genuine leather or leatherette. For protection and appearance, your men will want to wear this hat. Also available in cap style—Model F. Standard suspension model available in either style.

LOCK-CLIP CRADLE



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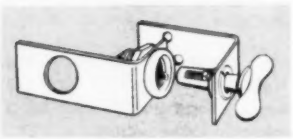

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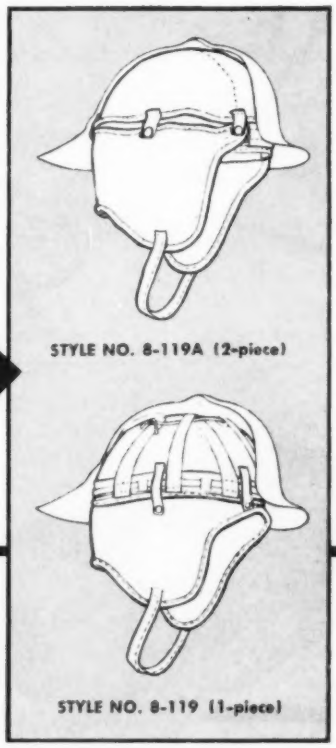

STYLE NO. 8-119A (2-piece)

STYLE NO. 8-119 (1-piece)

MODEL F (CAP)

MINER'S LAMP BRACKET

Designed to fit lamps of all makes and models, the Miner's Lamp Bracket may be attached to either Davis Plastiglas Hedgard (Model E or F). Safe, steady base for illumination.

Write for Bulletin #1407

DAVIS EMERGENCY EQUIPMENT CO., INC.

64 Halleck Street, Newark 4, N. J.

(For further details, use Key # L-5 on free Inquiry Card on page 69)

SAFETY DAVIS DIVISION

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T M REG U S PAT OFF

SILICONE TREATED

For perfect lens cleaning at lowest cost. American industry's swing to MAGIC LENS TISSUE (Silicone treated) is one of the greatest success stories of the Safety field.

Each sheet is over 50% larger than usual. Yet Magic costs you less. $8.40 per Carton (6 refills per carton). The compact Dispenser is only $2.50.

Now comes our HEAVY DUTY Cleaning Station; for coal mines, foundries, heavy-grit areas, or where anti-fogging fluid is necessary as in packing houses, canneries, etc.—on PLASTIC GOGGLES, SAFETY SHIELDS or any PROTECTIVE SURFACE.

The MAGIC fluid is Pressure-packed. No pump. No fuss. No mess. About 1,400 applications per can. Goes twice as far as old-fashioned pump-type cleaners, and each can holds twice as much as the old-fashioned bottles. This cuts your maintenance 75%.

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The Heavy Duty Dispenser locks the can in place. No pilferage. 20 gauge steel. Indestructable. Compact. It is so ingeniously constructed, including ample space for disposal of

OR THIS FOR HEAVY DUTY

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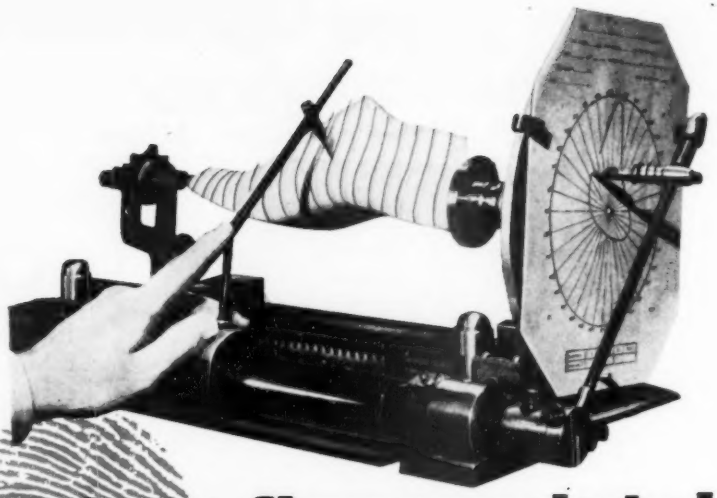
The Silicone Paper Company of America, Inc.

General Offices: 230 Park Avenue, New York 17, N. Y.

(For further details, use Key # L-6 on free Inquiry Card on page 69)

feet



are as different as fingerprints!

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YOU CAN'T ARGUE

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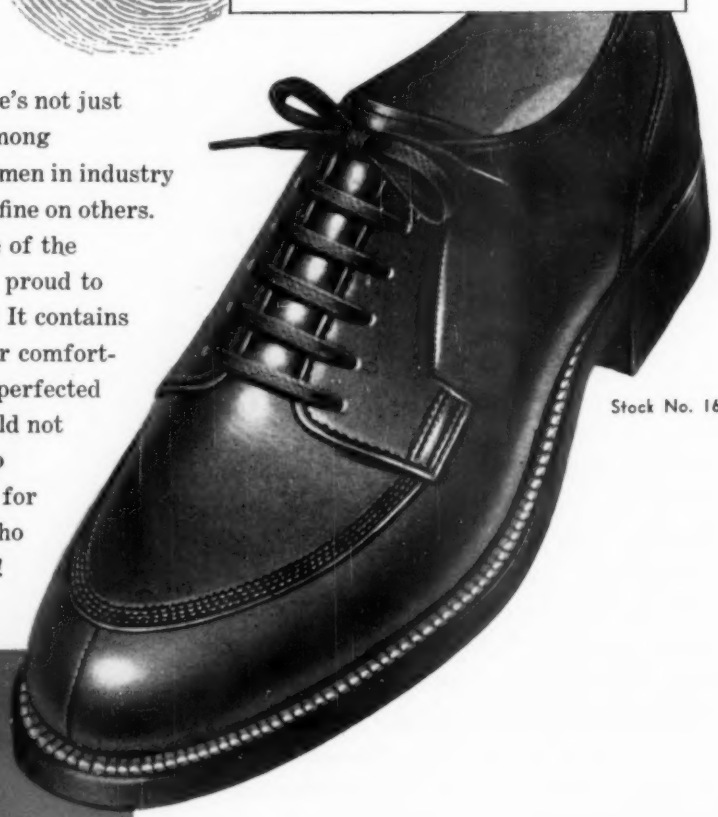

Stock No. 1662

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SAFETY SHOE COMPANY
ALLENTOWN, PA.

(For further details, use Key # L-7 on free Inquiry Card on page 69)

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SAFETY MAINTENANCE & PRODUCTION

FORMERLY "SAFETY ENGINEERING"

EST. 1901

VOL. 106, NO. 5 **NOVEMBER, 1953**

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AMERICA'S PIONEER MAGAZINE IN ITS FIELD

SAFETY MAINTENANCE & PRODUCTION is indexed regularly by Engineering Index, Inc., New York

It's Safety to Say

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★ MORE SAFETY FOR FEDERAL EMPLOYEES

IN THE light of United States Senator Saltonstall's exposé of laxity in accident prevention in agencies of the Federal Government (see SAFETY MAINTENANCE & PRODUCTION, October 1953), added point is given by the address of Hon. Harrison C. Hobart, Assistant Secretary of Labor at the National Safety Congress late last month.

According to Mr. Hobart, the nation's Secretary of Labor told a cabinet meeting the Federal story of on-the-job deaths and injuries whereupon President Eisenhower called upon department and agency heads to establish and improve safety programs and asked for a quarterly report on progress. Mr. Hobart reported that a letter was written to department and agency heads in which the Secretary of Labor stated: "It is most difficult for me to reconcile the position of leadership which our government should assume in accident prevention, in the face of 243 deaths and more than 42,000 injuries this past year . . . nothing can replace a missing hand, an eye, or pay for the hours spent on a hospital bed following an injury. Until we can erase these casualties from the record books, I do not feel that our obligations have been fulfilled as officers of government."

"It is conservatively estimated that in 1952 work injuries cost the Federal Government at least one hundred million dollars, counting both direct and administrative or production losses," the Secretary said and he urged that immediate steps be taken to improve the accident prevention methods in those agencies whose records were below the Federal average.

In these days when responsible government officials see the need for balancing the nation's budget, it is particularly disquieting to note the absolute waste of financial and human resources represented by preventable accidents.

In the matter of a realistic approach to safety, the Federal Government should be no different from private industry which has achieved almost spectacular goals in accident prevention, often in the face of dramatic hazards with which the average Federal employee is not confronted. Obviously, then, all agencies of the government have the obligation of setting an example for safety. Certainly, there is little excuse for lagging behind industry with its attendant hazards long since recognized and treated so successfully by industrial management.

If necessary, it would seem advisable for the Federal Government to "borrow" from private industry experts in all phases of accident prevention to go out as a training team to help reduce accidents in Federal employment. At the very least, this should help to provide good public relations.

★ COOPERATION, NOT COMPETITION

IN THE glare of a spotlight in the darkened ballroom of Chicago's largest hotel, the National Safety Council was formally presented with a Federal charter.

Rep. Clifford Davis, Tennessee, represented the Congress of the United States in the ceremony at the annual meeting of Council members which launched the 41st National Safety Congress last month. The Hon. Mr. Davis said the charter symbolizes the confidence and trust reposed in the Council by the government of the country. Acceptance was by Ned H. Dearborn, Council President.

On August 13, 1953, President Dwight D. Eisenhower approved the Act of Congress which granted a Federal charter to the National Safety Council. It is expected that the operations of the Council will be transferred from the present Illinois corporation next January. Operations under the new charter will not change the organizational plan of the Council nor will there be any changes in the membership set-up.

The new Federal charter is intended "to further, encourage and promote methods and procedures among employees and employers in industries . . . in the homes and on streets and highways." It is designed "to encourage the adoption and institution of safety methods by all persons, corporations and other organizations . . . to cooperate with, enlist and develop the cooperation of and between all persons, corporations and other organizations, both public and private."

★ CONVENTION HIGHLGHTS

AS THIS issue is being prepared for presses, the Annual National Safety Congress and Exposition is in session before 12,000 delegates from all parts of the free world. Highlights will be presented in the next issue. H. A.

DANGER!

SO FAR...AND YET

SO NEAR!

No less vulnerable to eye accidents than the shop worker himself, is the occasional visitor to hazardous zones away from his own desk or drawing board. In fact, his very lack of familiarity with such surroundings may create the most dangerous situation that occurs in your shop. He needs eye protection, too.

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Ideal for just such personnel, as well as workers in semi-hazardous zones, is this non-sparking Bausch & Lomb frame fitted with impact-resistant lenses. It is also suited to workers whose skin is sensitive to metal frames. Ful-Vue temples for unobstructed side vision, 5 bridge widths, 3 lens sizes. Ideal for safety lenses ground to worker's prescription. For complete data, write: Bausch & Lomb Optical Company, 90523 Smith St., Rochester, N. Y.

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3. **Plant Surveys on Eye Protection**—Bausch & Lomb offers services of experienced safety experts to investigate problems of eye-hazardous operations in your plant and make recommendations for their solution.

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BAUSCH & LOMB *Safety Eyewear*

(For further details, use Key # L-8 on free Inquiry Card on page 69)

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Why Your Workers Will Want to Wear

TUC-AWAY
MODEL 415

WATCHEMOKET eye SAVERS

EYE-SAVERS ARE DESIGNED TO PLEASE THE WORKER, AS WELL AS PROTECT HIM

Note—failure of the employee to wear the equipment provided to protect him has been the greatest cause of accidents involving the eyes, according to an opinion expressed recently by the Safety Manager of one of America's largest corporations.

LIGHTWEIGHT, SMART STYLING

Featherweight construction and attractive design are two important reasons why workers *like* to wear the Tuc-Away. Weight is only 1¼ ounces. Methacrylate lenses are two-thirds lighter than glass.

REPLACEABLE LENSES SNAP IN, SNAP OUT

Clear or colored lenses can be removed and inserted quickly and easily by the worker. No need for a special repair department to meet different hazard conditions. Once in place they cannot be knocked out.

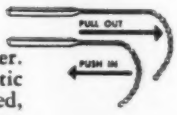
SIDE AND BOTTOM PROTECTION

Semi-cup lens provide clear, two-way protection. Also available for bench work with full (1″) side shields and regular (½″) side shields.

OPTICALLY CORRECT, BETTER VISIBILITY

Cast from methyl methacrylate, the only optical material that is naturally colorless and therefore absolutely clear. No distorted vision to cause eye strain.

EASILY ADJUSTED TO PROVIDE PERFECT FIT FOR ANYONE



Any pair of Tuc-Aways will fit any worker. All he has to do is telescope the new Plastic Retrax* Temples in or out. Once adjusted, the temples hold firmly in place. And Retrax Temples save you money — there is no need to stock extra frames of various temple lengths.

GREATER COMFORT THROUGH "BALL-CHAIN" HOOK CONSTRUCTION

Sturdy, light, all-plastic temples — the first to rival the flexibility and ear comfort of the popular metal Retrax Temples. Plastic "ball-chain" hook design fits comfortably over the cartilage contour behind the worker's ear. Stays on . . . comfortably.

SURE-FITTING UNIVERSAL NOSEPIECE

Nosepiece fits *on* the nose. It's a lot more comfortable, leaves no marks, does not pinch the sinuses. And it eliminates the expense of carrying extra size bridge stock.

SHATTERPROOF, SAFE

Lens will not shatter or throw a splinter into eye. Made just as hard and scratch resistant as possible without becoming brittle.

See Your Eye Savers Supplier, or write direct, for full Information on the Tuc-Away and other modern Watchemoket Safety Glasses.

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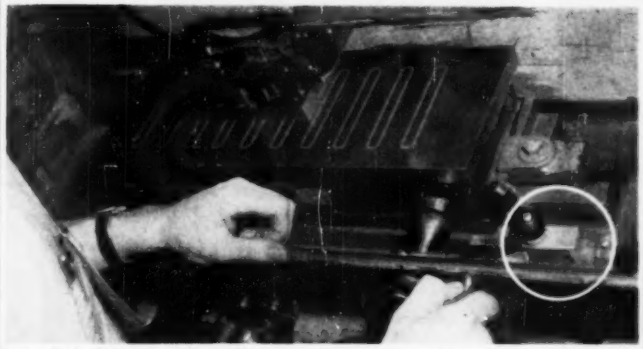
(For further details, use Key # L-11 on free Inquiry Card on page 69)

SAFETY MAINTENANCE & PRODUCTION

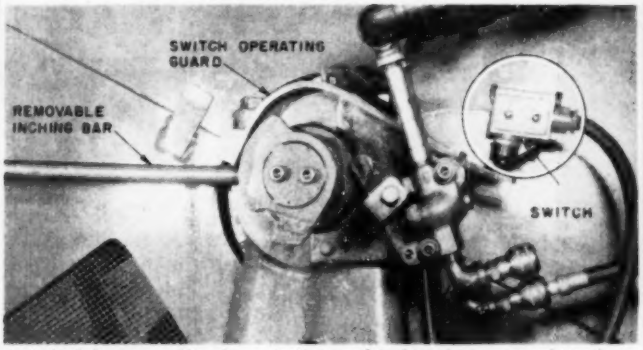
VOL. 106, No. 5 • NOVEMBER, 1953

Switches And The Safety Interlock

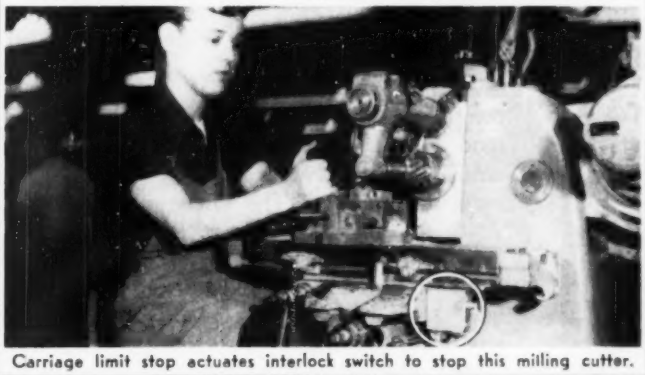
By A. L. RICHE
Vice-President, Micro Division
Minneapolis-Honeywell Regulator Company
Freeport, Illinois



Interlock keeps machine from starting til magnetic chuck grips stock.



Interlock keeps machine from starting until inching bar is moved in place.



Carriage limit stop actuates interlock switch to stop this milling cutter.

"INTERLOCK" is simply a technical term that means when one thing occurs, something else happens, or is prevented from happening. Interlocks as machinery guards are usually either mechanical trips or electric switch devices. The operation of the machine is either prevented, stopped or controlled by these interlocks.

The principles of electric interlocks are simple. An electric switch which turns on the light when a refrigerator door is opened is an example. One often used device in interlocking is the limit switch that stops motion or gives a signal when something moves to a certain place. A switch fastened to a lathe bed, which will turn off the motor when the crosshead is coming against it, is a limit switch. These switches are often used to keep machines from damaging themselves, and are as easy to put on an old machine as to design into new equipment.

Limit switches and other electric interlocks do things automatically that could be done by hand. Usually they "feel" the

(Continued on page 61)

Mercury switch (lower left), and snap-action switches are the brains of safety interlocking.

Approach suit has aluminized outer facing, and glass wool insulation.

Hood, coated with aluminum and insulated with glass fiber, protects wearer against heat and flame.

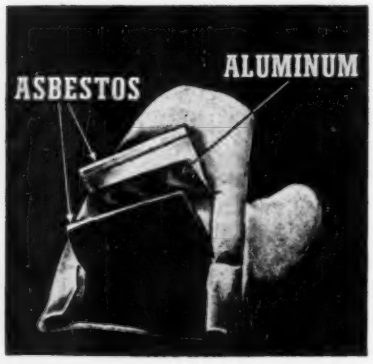
...FOR FIRE NEW

THE progress of man is, in many ways, a history of his growing ability to face new dangers and protect himself against them. Nowhere is this more apparent than in industry. For every productive gain invariably produces new personal hazards for the worker. In each forward step, protection must go hand in hand in technical advances, or the technical advances will remain unusable.

Atomic fission, new materials, quicker and more complicated production processes and bigger and more powerful machines have multiplied our serious safety problems as well as increasing our industrial capacity. The safety phase, always a vitally integral part of the production process, is combating and overcoming these newest problems. In this closely linked chain protection is now using products of earlier production to protect the newer production processes.

Two of these earlier developed items which are guarding industry against the dangers of its latest

Aluminized glass cloth (below, left) reflects radiant heat.
Aluminized foil over fabric (below, right) also mirrors heat.



Aluminum - lined, asbestos, reversible mitt can handle objects as hot as 1200 degrees Fahrenheit by reflecting their heat.

...FOR RADIANT HEAT

FEATURE

Second article of a feature series on Protective Clothing. Next article will appear in the December issue.

CLOTHING...

progress are aluminum and glass. In various forms and in combination with each other, aluminum and glass are enabling workers to withstand new hazards and to accomplish tasks they could not attempt before. Transformed into new shapes, they are being used in new protective clothing against fire, heat, radiation, chemicals and impact.

Lead glass fabric gown provides complete protection of all vulnerable parts of the body against x-radiation and beta radiation from atomic fission products. Workers no longer risk exposure to arms, lower legs and shoulders, as they once did.

...FOR RADIATION

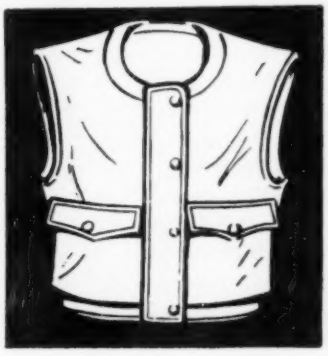
Against fires, these materials are incorporated with others in rescue and walk-in suits. Aluminum reflects the heat of the flames and glass fully insulates the wearer.

In one type of suit, for fire rescue work, an outer layer of 90 percent asbestos cloth is followed by aluminum foil, an inch of fiber glass and an inner lining of plastic-treated glass cloth. The asbestos resists the fire, the foil mirrors the heat, the fiber glass insulates the body, and the inner facing serves as a barrier to steam. Temperatures up to 1800 degrees Fahrenheit have been successfully resisted by this type of suit. A rescue blanket of the same material is also obtainable. A fire-approach suit is in use which also utilizes the high-heat stopping value of glass-wool insulation. The inner layer of the suit is flame-proofed material; the outer layer is

Laminated glass-cloth forms vest which protects machine operator from high-speed metal fragments.

...FOR IMPACT

Fiber glass plates incorporated in a vest of laminated ballistic nylon provide flexible body protection for dangerous occupations.



composed of aluminized glass cloth. In between, the glass wool performs its insulating function. Gloves, trousers, coat and foot protection are all of the same construction. In both fire-rescue and fire-approach suits there is provision for oxygen equipment.

The durability and light weight of glass fiber clothing has produced additional benefits in the form of quicker donning, greater mobility and less fatigue. Besides the fact that it will not burn, fiber glass resists most acids, corrosive vapors and oils. It will not shrink or stretch.

The problem of radiant heat seriously hampers production and maintenance. It prevents repairmen from entering hot areas until they have been shut down for a long time, it wears out men working near furnaces, pipes and other hot operations, it increases the number of workers needed for a particular job, results in absenteeism, and raises costs. It is in the solution of this problem that aluminum is most useful.

As foil, it can be used to cut off heat and sparks from welding and hot oven or furnace operations by hanging it as a curtain around the hot area, and by forming it into shields to approach excessively violent heat. Foil can serve as a lining for asbestos gloves to permit handling of materials as hot as 1200 degrees Fahrenheit. Laminated to fire-resistant fabric, foil can be cut into heat-repellent safety clothing. It reflects heat as a mirror reflects light; and, used as a shield with sufficient air space between its outer surface and the heat source, it has maintained comfortable conditions for workmen, despite 2000 degrees Fahrenheit temperature.

As a paint or coating on glass cloth or fabric it permits men to work in comfort near furnaces and, in some cases, to enter furnaces for repair work. In one instance, an aluminized fabric suit enabled workers to adjust furnaces in 400 degree heat and remain in this temperature for periods of up to 45 minutes. Aluminized glass cloth combines both the reflective qualities of the aluminum and the fire-proofing, strength and light weight qualities of the fiber-glass construction.

Fiber glass cloth coated with plastic has still other uses as protective clothing. It is excellent as a fabric of high-chemical resistance. It is unaffected by water, oils, greases, alkalis, and most acids. Besides its fire-resistant properties, in combination with plastic it will not rot or mildew, shrink or stretch, is waterproof, resists and won't absorb dirts, resists wear and tearing, and resists extremes of temperature.

It can be made into aprons and protective garments of many sorts for laboratory and plant. Tarpaulins, welding curtains, machine covers, awnings, outdoor and indoor curtains, and truck covers are some of its many applications.

In still another use developed for it, fabrics made of leaded glass fiber are used to form protective garments for radiologists, technicians and inspection personnel who are exposed to beta and x-rays. These gowns cover all parts of the body which are vulnerable to the products of atomic fission. Previously, these workers had to depend on lead rubber aprons alone. They risked exposure of their arms, shoulders, and lower legs to scattered radiation.

In this form fiber glass retains its light weight, flexibility and strength, chemical resistance, fire-proof, non-shrinking, non-allergic, and non-deteriorating qualities. It also has other applications such as for x-ray curtains, skin protection, etc.

Manufacturers have again turned to fiber glass in searching for a protection for machinists against metal fragments and particles, thrown from high speed cutting and milling machines. One vest developed covers the torso, yet weighs only 3 pounds. It is made of laminated glass cloth and is only one-eighth inch thick. Under tests it stopped a .38 caliber bullet fired from 8 feet.

Another type of body armor employs laminated ballistic nylon as a vest to hold overlapping plates of fiber glass. The outside covering is also made of nylon, a heavy-duty type for hard wear. Again, light weight and maneuverability are additional features to protection.

There will undoubtedly be more uses for aluminum and glass in protective clothing as new hazards are encountered, but their use against fire, heat, chemicals, radiation and impact form the latest developments in the field of protective clothing.

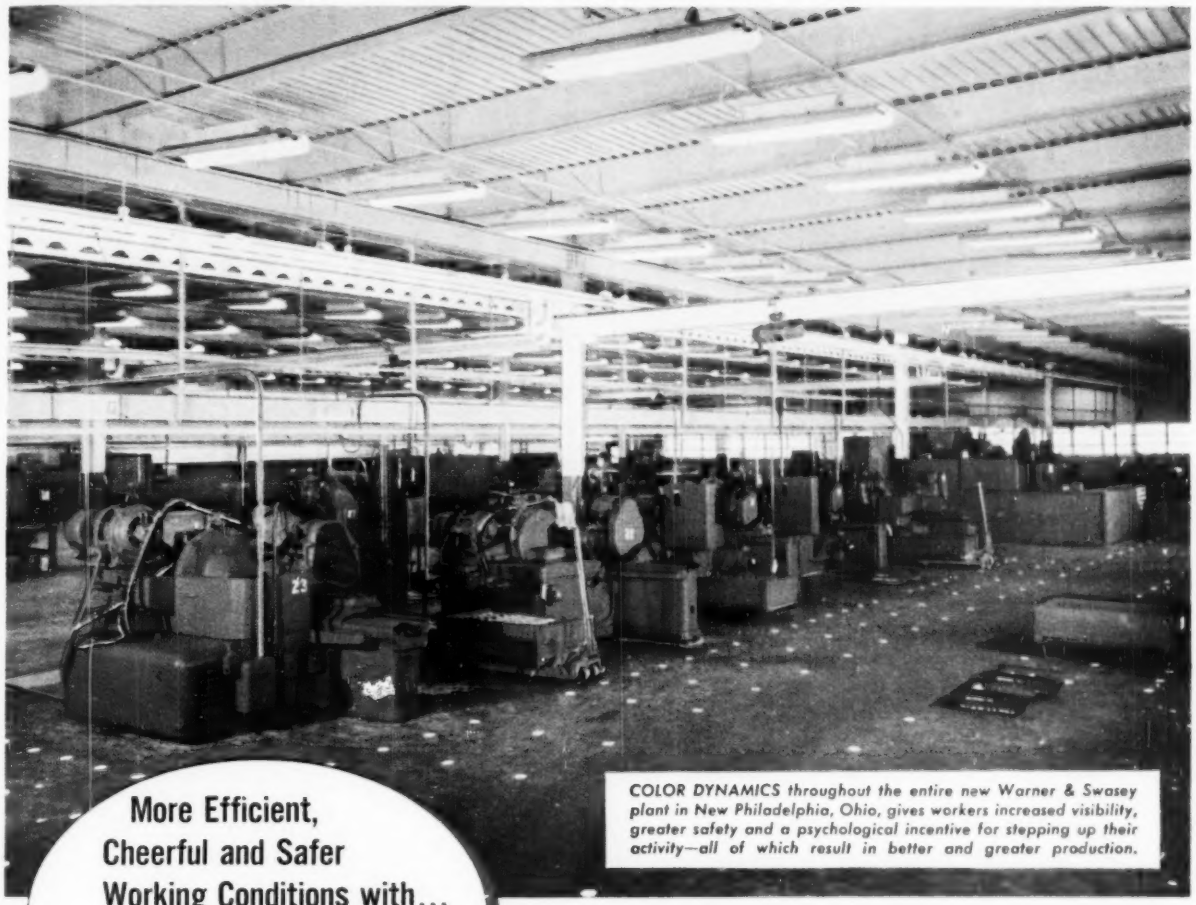
Picture Credits:
Upper left hand corner—Fyrepel Products, Inc.
Lower left hand corner—Fyrepel Products, Inc. (left); Frommelt Industries (top); The Milburn Company (bottom).
Lower right hand corner—Armor Specialties Corp. (left); B. F. McDonald Company (right).
Upper right hand corner—Bar-Ray Products, Inc.

Trade Associations Promote Safety

FOR their work in promoting safety in small business, eleven trade associations were presented with the National Safety Council's award during the sessions of the 41st National Safety Congress and Exposition in Chicago, Oct. 19–23. The awards were presented by Ned H. Dearborn, president of the Council, at a special luncheon meeting for association executives Oct. 20. The eleven member associations honored were:

American Association of Oilwell Drilling Contractors
American Foundrymen's Association
American Gas Association
American Petroleum Institute
British Columbia Lumber Manufacturers Association
Dominion Brewers Association
Drop Forging Association
Institute of Industrial Launderers
Manufacturers' Association of Montgomery County
Pacific Coast Association of Pulp & Paper Manufacturers
U. S. Brewers Foundation, Inc.

The award gives recognition to associations for the general excellence of their safety services and for their contribution to the reduction of occupational injuries in their industries. In making the awards the Council's technical committee and committee of judges took into consideration accident prevention activities such as publicity, safety conferences, contests and publication of technical material.



COLOR DYNAMICS throughout the entire new Warner & Swasey plant in New Philadelphia, Ohio, gives workers increased visibility, greater safety and a psychological incentive for stepping up their activity—all of which result in better and greater production.

More Efficient, Cheerful and Safer Working Conditions with...

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Functional use of colors lessens eye fatigue, improves productivity, boosts morale and reduces accident hazards in new $3,000,000 Warner & Swasey plant.

● **An excellent example** of the plant environment which Pittsburgh COLOR DYNAMICS provides is the new $3,000,000 plant of The Warner & Swasey Company recently opened in New Philadelphia, Ohio.

● **In this new plant** Warner & Swasey manufactures parts for turret lathes, automatic screw and tapping machines, textile machinery and grading equipment. The entire structure was painted according to COLOR DYNAMICS.

● **The reasons for the choice** of COLOR DYNAMICS are best expressed by Walter K. Bailey, vice-president in charge of manufacturing:

● **"We chose to use color** functionally in order to create an environment that would be pleasing, cheerful and, at the same time, improve the productivity of our operators. We selected colors that would increase visibility without causing eye fatigue.

● **"We also painted** recreation and rest areas in colors that would provide a welcome change of pace and return the workers to their jobs feeling alert and refreshed.

● **"Above all,** we wanted to create a work place of which the entire community could be proud. How well we succeeded is best shown by the enthusiastic comments when we held 'open house' at the time of our opening. This was further confirmed by the flood of applications from men who wanted to work in these surroundings. From every standpoint, we believe COLOR DYNAMICS is an investment that will pay off for years to come."

FREE—Color Engineering Study of Your Plant!

● Why not test the practical value of COLOR DYNAMICS in your plant—on a machine or two or in a whole department? Send for our free book which explains how you can use this modern painting system simply and easily.

● Better still, call your nearest Pittsburgh Plate Glass Company branch and ask to have a representative give you a detailed color engineering study of your plant, or any part of it, without cost or obligation. Or mail coupon at right.

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Department SMP-113, Pittsburgh 22, Pa

☐ Please send me a FREE copy of your booklet, "Color Dynamics."

☐ Please have representative call for Color Dynamics Survey without obligation on our part.

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CONSTRUCTION FEATURES

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- Snap-tight fasteners permit speedy, secure attachment of windows to headgear units.
- Formed fibre crown protectors extend coverage over brow; support windows firmly.
- Disposable sweatbands of absorbent, anti-septically treated paper for new maintenance economy and improved industrial hygiene.
- Fibre headbands treated for moisture-resistance, tough, easy to clean, easy to adjust.
- Plastic sleeves cover adjustable headbands for added smoothness and comfort of fit.
- Adjustable spring tension assembly permits easy lifting of window to raised "off" position; holds securely in lowered "safe" position.

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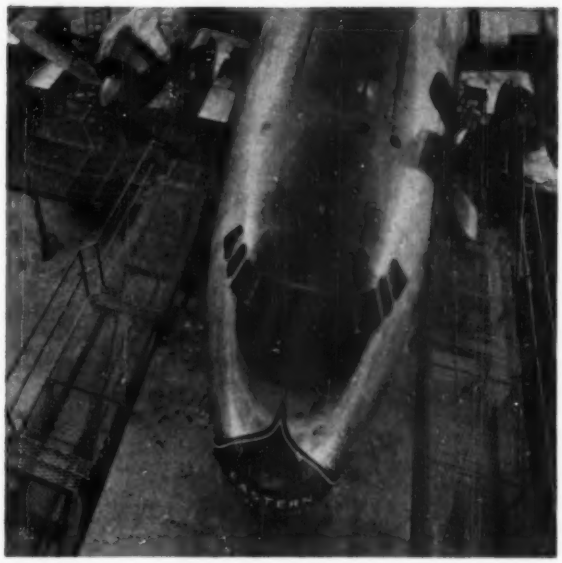
Efficiency: UP

Costs: DOWN



View of part of maintenance stand assembly illustrates area covered. Engines may be approached from all 4 sides. There are shelves for tools and walks from one section to the other.

Maintenance stands are assembled by crewmen, then rolled into position for beginning of safe, speedy job. Stands are light and can be assembled with screwdriver and wrench.

Sectional, Mobile Maintenance Stands Eliminate Numerous Problems and Cut Time Spent Servicing Huge Airliners

ONE of the most serious threats to efficient operation of air lines is wasted moments. World-wide flight schedules, timed to the minute, can be disrupted by a single tie-up anywhere along the line.

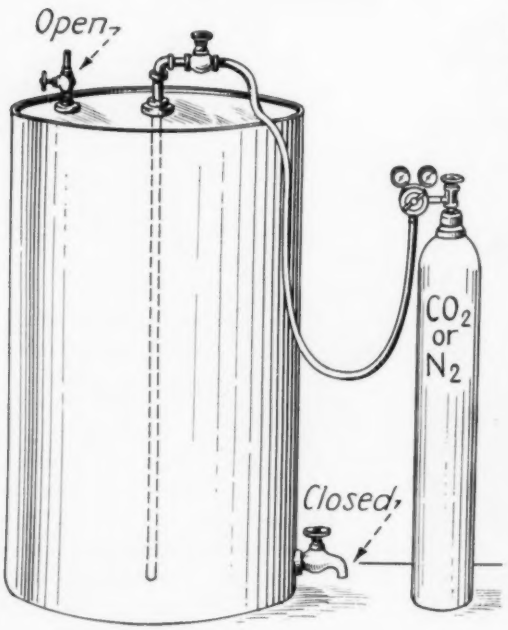
In the past, aircraft maintenance did not present nearly the problem it does today. A major line had less than a score of planes in operation, and they were of a much smaller type than the latest 88-passenger Constellations. Fewer mechanics could take more time, on less complex work. Those days are gone forever. Now, Eastern Airlines, for example, flies a 10,000 mile route, encompassing 93 major cities in 27 states—and has an employee for every mile of that route.

To aid servicing of these huge planes, new mobile maintenance stands, constructed partly with diamond-patterned expanded metal plating, have been delivered to Eastern. Assembled from 20 sections, the stands are rolled into position around the towering Constellations. They are put together by the crews using them, an operation requiring only basic tools such as wrenches and screwdrivers. When fully as-

(Continued on page 26)

1. Use hood to draw off welding fumes.

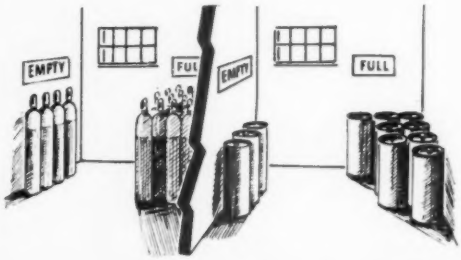
2. Transport securely all gas cylinders, chained to metal carts. Keep cylinders chained at all times, except when replacing empty with full cylinder. Keep cart on firm foundation.



3. Purge tank with carbon dioxide or nitrogen for welding.

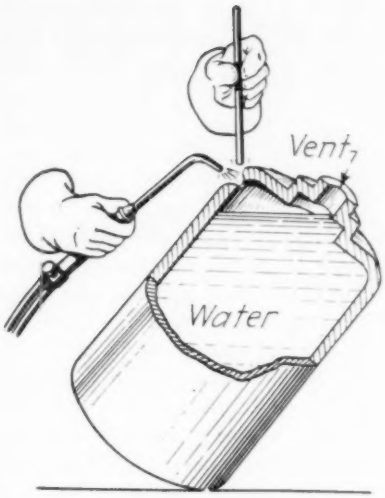
8. Clean torch tips and nozzles with proper size twist drill and correct up-down-motion.

9. Use sheet metal guards and asbestos sheets to protect combustible materials against sparks from welding torch.

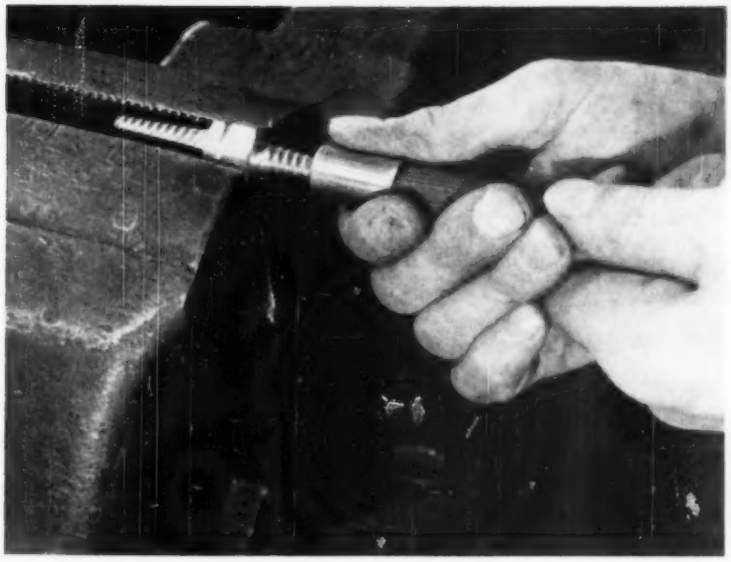


10. Store cylinders carefully as shown in the sketch at right.

4. Mark work carefully to warn other employees against "hot" hazard.

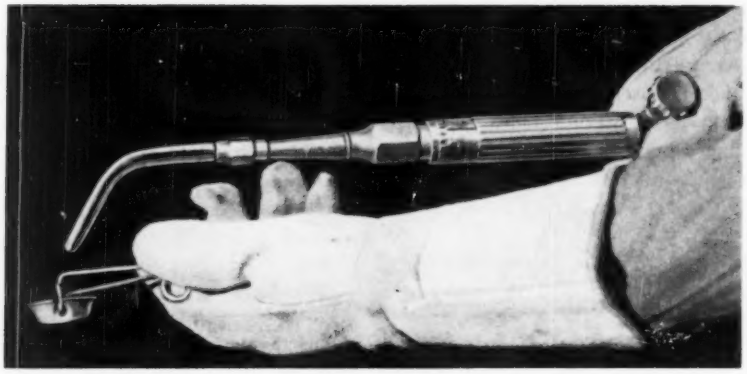


7. Weld can which held flammables with care. First clean or purge container. Disconnect or blank all pipe lines. Leave vent to allow air and gas to escape. Then fill container with water to within a few inches of the point of welding or cutting.



6. Use splice to connect hose sections after cutting out damaged hose.

By SIMON A. GREENBERG
Technical Secretary
American Welding Society



5. Use friction lighter only for lighting torch; never use matches. Check proper method.

WELDING is safe; probably safer than driving a car on a holiday weekend.

That welding is safe is no lucky chance. Safety in welding and cutting operations has been achieved through the co-operative efforts of management, employees, equipment manufacturers, and others interested in good welding practices. It has become an accomplished fact by recognition of the hazards involved in dealing with fire, compressed gases, hot metals, sparks, fumes, and other such sources of danger, and through the establishment of proper precautions to control the hazards involved.

The efforts of the American Welding Society and the International Acetylene Association have produced much information on safe practices for industry. A new American Standard, "Safety in Electric and Gas Welding and Cutting Operations," has been issued by the Society. The committee which prepared the standard included equipment manufacturers, welding engineers, safety engineers, insurance company representatives and governmental labor officials.

Safe practices in welding and cutting are the same as efficient practices. For example, excessive pressure in gas welding or cutting not only causes flying sparks, but

wastes fuel gas. Excessive oxygen-cutting pressure increases the distance that sparks will fly. Strewn scrap and dirt are a fire hazard; they also hamper movement of the welder or cutter, and make welding or cutting more difficult. Poor ventilation may not only be a source of toxic fumes; it can cause poor welding by making visibility difficult.

Welding Cooperation

Safe welding depends also on cooperation from everyone. In a typical setup for gas welding note the part each person must play in achieving safety. The same basic factors apply to oxygen-cutting operations.

To begin with, management must do its share by providing a safe location, specifically designated for regular welding operations. This is as true for maintenance welding as it is for production welding. Regularly designated welding areas should have floors of non-combustible materials, should be well lighted and well ventilated. Proper benches, materials handling and positioning equipment should be available for safe and efficient handling of assemblies before, during, and after welding. From the standpoint of welding equipment and materials, cylinders, torches, hose, and other welding apparatus should all have proper locations and hangers provided as necessary to prevent damage. Such facilities should include stands, cradles, or other means to handle and fasten cylinders to prevent falling. They should also include a location, away from the welding area, for storing cylinders not in use and empty cylinders to be returned to the supplier. Oxygen cylinders should be separated from acetylene cylinders, and full cylinders from empty cylinders. Provision should be made for hanging torches and hose in a safe location when not in use. Proper eye protection should be provided for welders and helpers, and the welding area should be divided from the rest of the shop by flameproof curtains or partitions.

Equipment manufacturers and suppliers do their part by providing equipment which has been carefully designed and engineered with safety in mind. Equipment, such as torches, should have the seal of approval of Underwriters' Laboratories, or Factory Mutual Laboratories, or a similar agency. Hose should be of durable construction and conform to code requirements.

Equipment manufacturers go to considerable trouble to furnish information concerning the handling and operation of their equipment. This information should be available to operating personnel and posted in a conspicuous location in the welding area. No one should be permitted to weld or cut before he can demonstrate that he is thoroughly familiar with the instructions for handling his equipment.

Welder's Responsibility

The welder's responsibility for safety is no less than management's or the equipment manufacturer's. He has been provided with safe and efficient equipment and materials and a safe location for welding. Careless or improper use of these facilities on his part, however, can still cause an accident in spite of all other efforts. Once established, safe practices are just as easy to follow as short cuts.

A welder should learn to set up his equipment properly. Manufacturer's instructions should be followed in connecting regulators to cylinders and attaching the torch. Not all torches operate alike; this is true not only for torches made by different manufacturers, but for different torches made by the same manufacturer. A match should never be used to light a torch; always use a friction lighter. A stationary pilot light is satisfactory for large production operations. Before starting to weld, the operator should check for dirt or scrap which should be cleared away. The work should be examined to be sure it will not fall and is not oily or greasy.

Proper maintenance of equipment cannot be overstressed. Torch tips and nozzles should be cleaned with the proper size twist drill or a piece of soft brass or copper wire. An up-and-down motion is used, not a rotary motion. Worn or damaged equipment should not be used. Replacement should be made with standard parts, properly attached. Makeshift repairs are worse than none at all. Equipment should be checked periodically and tested for leaks. Leaks in torch and regulator valves may sometimes be corrected by merely tightening the fittings; worn parts should be replaced. When in doubt, return the equipment to the supplier for check and replacement if necessary. Worn and leaking hose and hose connections should be repaired. Defective hose should be cut out and a splice made, using proper hose connections.

Empty cylinders should be marked "Empty" or "MT" and removed from the welding area after all valves have been shut and valve-protection caps replaced. It is good practice to identify the contents of a cylinder by the name of the gas, clearly shown on the cylinder. The color or shape of a cylinder is not a positive means of identification. When work is stopped for a short period, to change welding rods or to move the work, for example, both oxygen and acetylene valves on the torch should be closed. The torch should be hung up or placed where it will not be damaged. When welding is stopped for some time, at noon or to change shifts, the entire setup should be shut down, including torch and cylinder valves in the order given in the manufacturer's instructions.

Personal Protection

The welder should be properly attired for his work. Woolen clothing is preferred to cotton clothing, not only because it is not so readily ignited, but because it also protects the welder from changes in temperature. Cotton clothing, if used, should be chemically treated to reduce flammability. All outer clothing should be clean and free from grease and oil. Since sparks may

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lodge in rolled-up sleeves or pockets, sleeves should be rolled down to the wrist and kept buttoned; pockets should be eliminated from the fronts of shirts and aprons. Similarly, trouser cuffs provide a trap for sparks; trousers should either be cuffless or turned up on the inside.

Low-cut shoes with unprotected tops should not be used, except possibly for small bench operations. As a rule safety shoes, with hard toes, should be worn. For overhead welding, or welding in very close quarters, ear protection should be provided. Hard hats or head protectors should be worn where there is exposure to sharp or falling objects.

Goggles must be worn during all welding operations, by helpers as well as welders. All parts of goggles should be well-constructed and able to withstand the heat of welding. Naturally, they must be flameproof, and of a material that will not readily corrode, or irritate the skin.

The shade of lens depends largely on the welding and vision of the welder. It should be dark enough to prevent glare irritation, yet light enough for the welder to see what he is doing. The proper shade of lens for light oxygen-cutting and gas-welding is Shade No. 5, for oxygen-cutting and for medium gas-welding, Shade No. 6, and for heavy gas-welding Shade No. 8. All lenses, regardless of shade, should be optically correct. They should be kept clean, and replaced when visibility is impaired by slag, scratches, or cracks. It is poor practice to transfer goggles from one employee to another without first sterilizing them.

Repair Welding

All the foregoing precautions and safety measures can be practiced easily in regular welding areas. However, when welding has to be done at other sites, as in making a repair or field welding, these ideal conditions are not always possible and additional special precautions become necessary.

If repair welding has to be done in a shop, for example, the floor should be swept clean and all combustible material removed. Wooden floors should be thoroughly wetted down with water, or covered with damp sand, sheet metal, asbestos, or a similar material. Where there are floor openings or cracks that cannot be closed or covered, the floor directly beneath the welding to be done, should be checked for materials which may be ignited from welding sparks. Combustible material which cannot be moved should be completely covered with a tarpaulin or asbestos sheets. Welding equipment should be located where it will not be exposed to damage. Hose should be neatly stacked and not left where it will encumber the welding operations. Do not place it where it can be struck by falling metal, run over by hand trucks, or stepped on. Neatly stacked hose not only protects the hose from damage, but makes it easier to draw additional lengths of hose.

Welding can be done safely in confined spaces, such as tanks or the holds of ships. It is mandatory that proper ventilation be provided the welder either by completely ventilating the space, or by providing individual respiratory equipment. Even where there is no likelihood of toxic fumes accumulating this is necessary to prevent oxygen deficiency. Gas cylinders should be left outside the confined space; and, where possible, an attendant stationed to shut off the gas supply in an emergency. When the welder must enter confined spaces through a manhole or small opening, some means must be provided for removing him quickly in case of emergency. Safety belts or life lines are convenient for this purpose. When it is necessary to stop work, the welder should not leave the confined space without shutting off his equipment at a point outside the confined area. Preferably he should remove his torch, although this is not mandatory if the work is to be resumed shortly.

When welding is to be done on platforms, scaffolds, or runways above-ground, the welder should be protected by railings, safety belts, life lines, etc.

In all the cases mentioned fire-extinguishing equipment should be provided. This equipment should include at least one fire-extinguisher, properly filled, a fire hose, and buckets of sand and water. In some cases it may be desirable to provide fire watchers. If so, they should remain at the welding location long enough after welding is completed to be sure no fire hazard exists. In any case, the welder, upon completion of his work, should mark it to indicate that it is hot, as a warning to other workers.

Fire Control

Drums, barrels, tanks and other containers that have held combustible gases or liquids should be completely cleaned and purged before being welded or cut. Pipe lines should be disconnected or blanked to stop any gas or liquid flowing through the area to be welded or cut. All hollow cavities and containers should be vented to permit the escape of air or gases. If possible, the previous contents of the container should be determined. This is not always possible, and in such cases all precautions should be taken. All containers, whether they contained grease, oil, gas, acid, tar or a similar substance, should be thoroughly cleaned. For very volatile substances steam or very hot water may be used. For other substances, such as heavy oils, a strong solution of caustic soda may be used. For other substances use a solvent.

Even though the container has been cleaned, the welding or cutting operation should be further safeguarded by filling the container with water to within a few inches of the point of welding or cutting. If filling with water is not practical an inert gas may be used. Carbon dioxide and nitrogen are commonly used. Carbon monoxide or the exhaust from an automobile engine should never be used.

Where a gas is used for purging it is necessary to make sure that the proper concentration of gas is main-

(Continued on page 26)

WOODSMEN SPARE THEIR HANDS!

SPLINTER accidents—wood-slivers driven into men's hands—have long been considered a "lumberman's burden."

Both men and management of Weyerhaeuser Timber's Everett lumber division realize splinter accidents to mill workers are a mutual problem—and a mutual challenge. Working together, they have come up with a highly successful solution to these minor, but painful accidents. Frequently soreness or infection makes them a major source of lost-time.

"The solution," says Keene Strobel, plant safety engineer, "lies in a glove that gives adequate hand protection."

Forty to 50 men a month were showing up at the plant's first-aid room for treatment. One man had 3 fingers impaled at once by a dagger-sharp bit of wood which slipped through the seam of his heavy gloves. The men had tried a wide variety of gloves, but after a few weeks of arduous lumber handling, even the toughest opened seams to provide a gaping entrance for splinters.

Mr. Strobel had talked to green-chain pullers, planing mill off-bearers, unstackermen and other men who handled lumber constantly during a day's work. Combing the catalogues of a dozen manufacturers, he had selected 50 pairs of sample gloves made of plastic, cloth, leather and even metal threads, to try out in the mill. Finally the trouble

Lumberman protects himself from splinters with seamless mitts and leather apron.

No seams to let in splinters in new glove.

was tracked to the thumb seams, which usually opened first under the strain.

At this point, industrial ingenuity went to work. A glove with a seamless palm and thumb component was specially designed and manufacturers were contacted to see if they could supply it in quantity. The first shipment of the new gloves arrived in Everett. Anxiously, Mr. Strobel distributed them among employees for testing.

Seven days went by. Two weeks. Three, then four. After 50 days, the new gloves were pronounced a success. Like the other gloves offered for sale locally, the "X" model had a leather face, wrist guard, thumb and a canvas back. Inexpensive in price, the new glove is cheap insurance against the insistent jabbing of tiny wooden bayonets.

There are still features to be incorporated—the gloves need a wider leather face to protect the edge of the wearer's palm on the little finger side, but that is being solved with a minor design modification.

"The important thing," says Mr. Strobel, "is that the men themselves helped design and test this glove. The lumber handler can now buy—at cost—a glove that he himself helped perfect."

Pictures by courtesy of Weyerhaeuser Timber Company.

Costs Down **(Cont'd from p. 19)**

sembled the maintenance stands accommodate as many as 50 men working on one plane at a time. Platforms on varying levels, connected by stairways, allow mechanics to reach motors, landing gear, fuselage, interior, wing and tail assemblies, without moving the stands. This factor means important time economy, bringing to a minimum the amount of time the plane is on the ground.

Expanded metal flooring and stair treads provide "see-through," light weight support, permitting drainage and keeping walkways grease-free. Accidents are reduced and general working conditions are improved. Tool racks are conveniently located and the entire structure is enclosed by railings for complete protection. Light in weight (4.27 pounds per square foot), the stands may be moved about freely, assembled and disassembled quickly. They can be moved to a new location without loss of time, and stored in a comparatively limited amount of space.

Strength and durability are among the most important features of this latest expanded metal application. Sheet steel, slit and stretched on presses, then cut to shape and size according to customer specifications, is used in producing expanded metal. No steel is sheared away in the process, and because the webs between diamonds are turned at an angle to the horizontal in the press, the steel has greater flexural strength from the equivalent size sheet from which it is made. It also covers a far greater area than the original sheet, dependent upon the degree of expansion of the diamonds.

Pictures by courtesy of Wheeling Corrugating Company.

Welding Hints **(Cont. from p. 24)**

tained. The carbon dioxide concentration should be at least 50 percent in the air space inside the container, and 80 percent or more in the presence of hydrogen or carbon monoxide. The required concentrations for nitrogen are at least 10 percent higher than those for carbon dioxide. The subject is covered in greater detail in the American Welding Society's publication, "Recommended Procedure to be Followed in Preparing for Welding or Cutting Certain Types of Containers Which Have Held Combustibles."

Welding materials which, when heated, give off toxic fumes requires protection. Except when welding lead, zinc and materials coated with these metals or cadmium, or mercury-bearing substances, there is no hazard of toxicity. When welding these metals, local exhaust ventilation, by hoods or ducts located directly at the welding station and as near as practicable to the work, must be used to provide air changes. Individual air-supplied respirators are an alternative. If welding these metals is infrequent it may be convenient to weld outdoors, where no special ventilation or respiratory equipment is necessary.

Welding fluxes in general are not toxic; exceptions are fluoride-bearing fluxes. These fluxes are more commonly used for brazing than for gas welding. In addition to the need for removing all toxic fumes generated by the fluxes with positive ventilation, precautions must be taken to prevent quantities of the flux itself from being taken internally. Observance of usual cleanliness, such as washing the hands before eating, will eliminate hazards from this source. A standard precautionary wording on the labels of fluoride-bearing fluxes has generally been adopted by flux manufacturers. A careful reading of these instructions as well as the manufacturer's literature is strongly urged.

It is difficult to cover every detail of safe welding practices in a single article. The safety standards mentioned should be reviewed in detail.

The important thing to remember is that responsibility for safe welding and cutting practices belongs to everyone. So too, the benefits from safe welding and cutting are everyone's: no loss of property, no injuries, no lost time or earnings, and no loss in production time. With everyone doing their part we will only have unavoidable accidents—which do not exist!

From a paper presented at a meeting of The International Acetylene Association.
Pictures by courtesy of International Acetylene Association.

A Safety Tip

AFFIXING ordinary rubber chair tips on projecting parts, such as rods and poles and sharp edges, will prevent scratches, abrasions and torn clothing of machine operators and others. Used on machines in this way, chair tips reduce trips to the first aid kit. They are economical and easily obtainable in various sizes and colors at hardware and chain stores.

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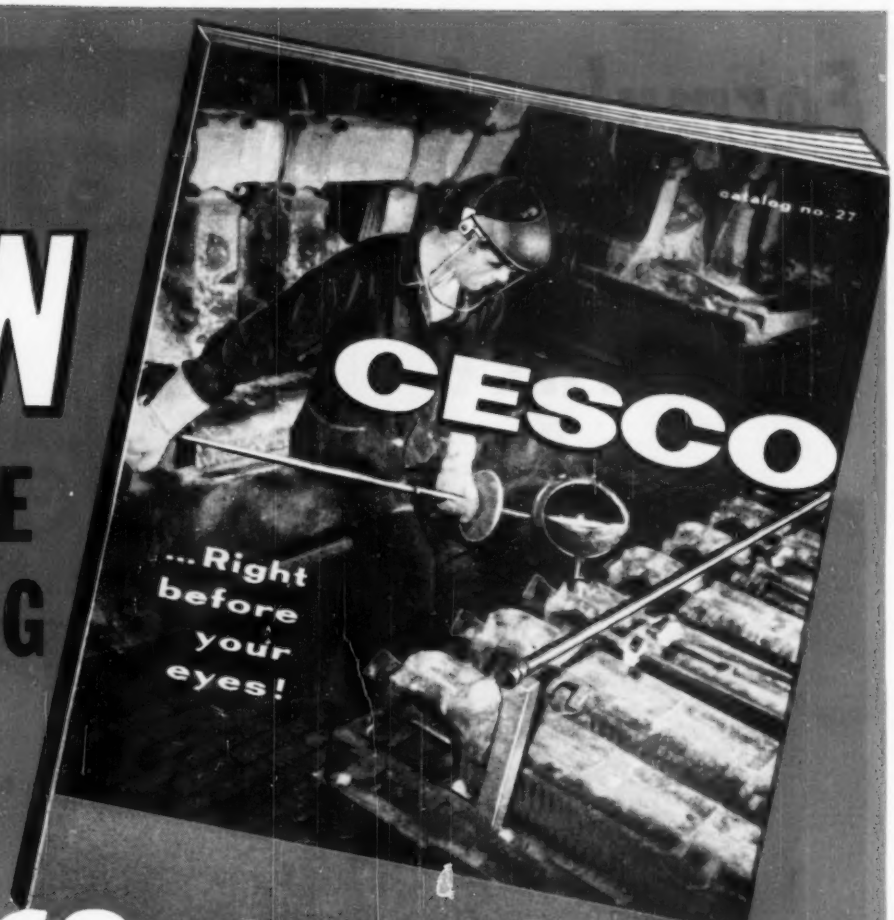

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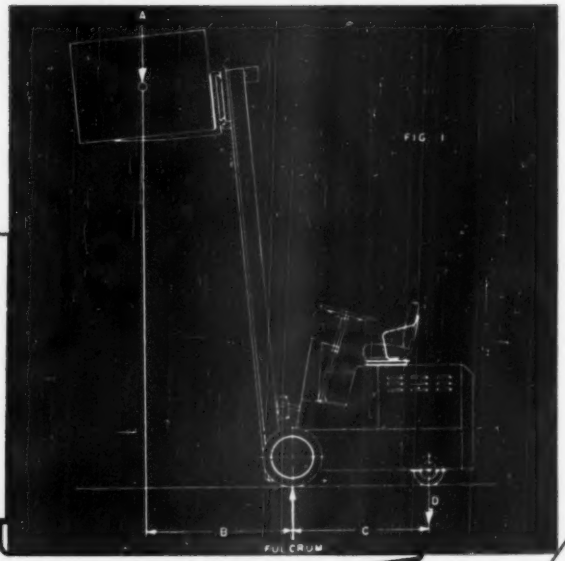
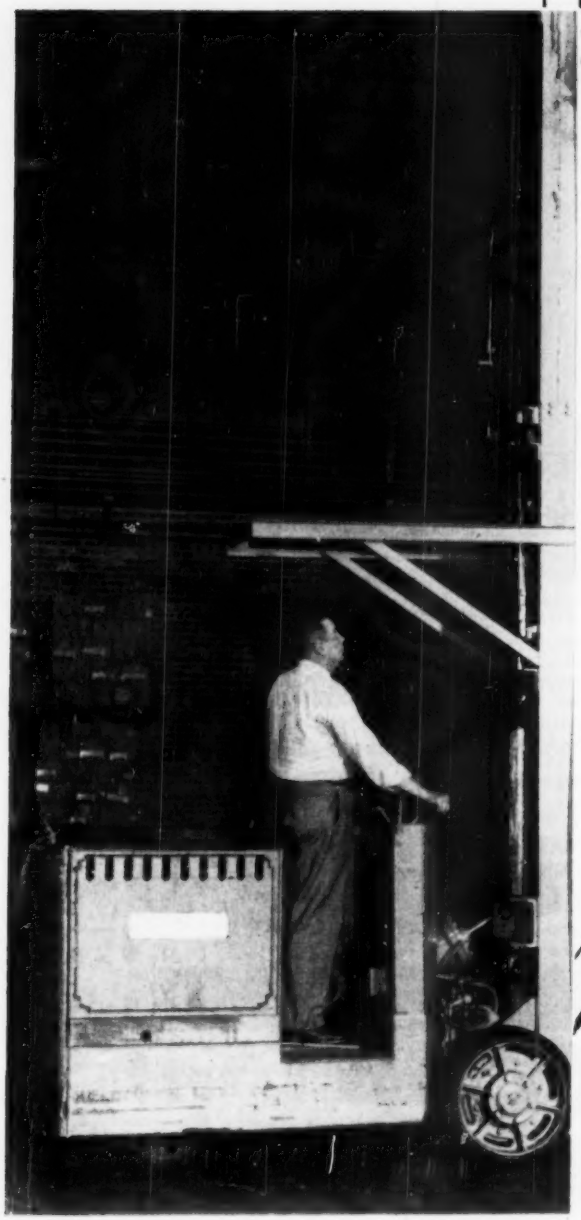
(For further details, use Key # L-14 on free Inquiry Card on page 69)

Formula for Fork Truck Balance

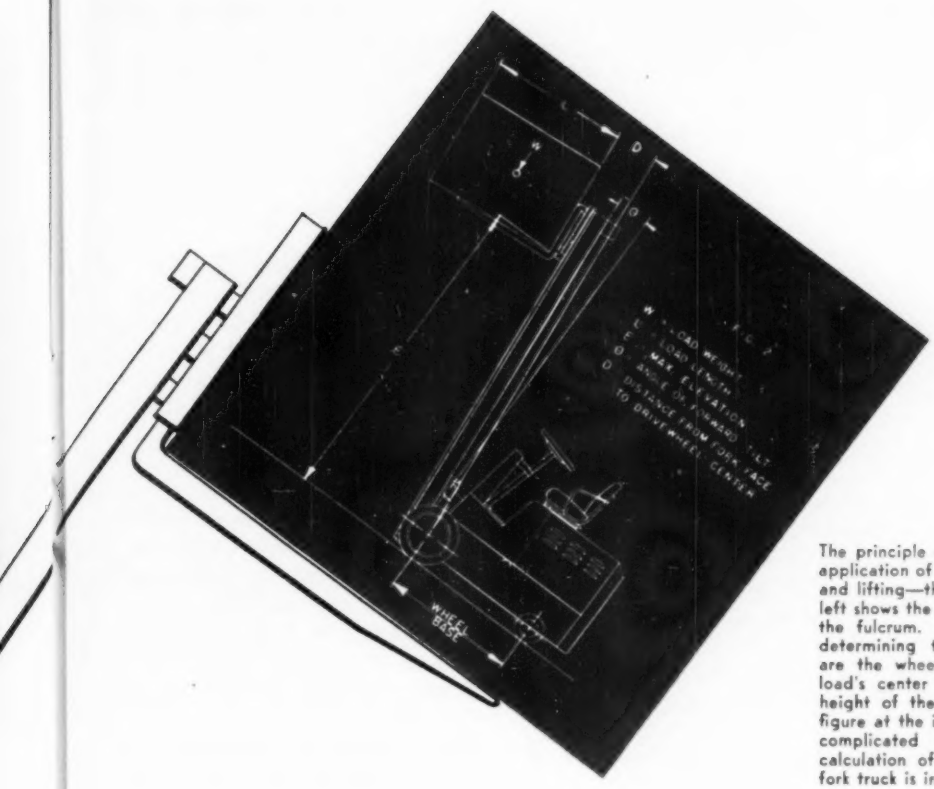




By HAROLD MILZ
Chief Engineer
Mercury Manufacturing Company
Chicago, Illinois

FEATURE

First of a series of feature articles on Material Handling Equipment. Next articles will appear in the December and January issues.


W = LOAD WEIGHT
L = LOAD LENGTH
E = MAX. ELEVATION
O = ANGLE OF INCLINED FLAT
D = DISTANCE FROM FORK FACE TO DRIVE WHEEL CENTER
WHEEL BASE

The principle of the modern fork truck is an application of the age-old device for moving and lifting—the lever. The figure at the far left shows the front wheel of the truck to be the fulcrum. The critical measurements in determining the ability of the fork-truck are the wheelbase, the distance from the load's center to the front wheel, and the height of the load from the ground. The figure at the immediate left shows the more complicated considerations entering into calculation of the point beyond which the fork truck is in danger of being tipped over.

THE present high cost, and in some cases the impossibility, of building new or additional storage facilities makes it important to stack materials in storage as high as is practical and safe. It is becoming increasingly urgent that every warehouse and storage materials handling engineer, "utilize the cube" to the best advantage.

This has resulted, upon occasion, in placing a premium on the stacking heights of fork trucks without regard for hazards and limitations. For safety and efficiency every user must understand the physical laws governing fork truck stability.

It is general practice to leave the problems of fork truck stability to the manufacturer of the truck. The conditions of operation are outlined and a truck is designated that will do the job. This is sound practice and works out well—***if the original job specifications are complete and accurately determined and transmitted.***

Many times overlooked is the fact that lighter loads can cause stability trouble if they are longer than anticipated, or are odd shapes with centers of gravity that fall too far forward. It is also true that heavier loads may put undue strain upon tires, brakes, wheel bearings and the hydraulic system.

Therefore it is extremely important for the truck purchaser to understand the factors that affect truck stability; to be familiar with the formulas involved; and to be able to apply them to his everyday materials handling problems.

Fork Truck Stability

A fork truck carries loads ahead of its wheels in cantilever fashion. Therefore, the downward force is in front of, not over, the points of support. The fork truck can be considered as a simple lever, Fig. 1, with the center of the front drive wheels acting as a fulcrum between the load and the counter-balance of the truck.

Thus, the trailing moment—the truck weight back of the forward wheels, D, multiplied by its lever arm, C—must always be appreciably greater than the forward moment—the load weight, A, multiplied by the length of its lever arm, B. Or, C x D must always exceed A x B. If it does not, the truck tips forward.

The principal factor determining the load that can be transported and tiered is the amount of weight remaining on the rear wheels when the loaded truck is tilted fully forward at the extreme of its lift capacity. Both electric and gasoline-powered trucks are subject to the same forces and conditions.

It is a simple matter to assure sufficient weight on the rear wheels, either by increasing the truck wheelbase or by increasing the counterweight, or both. However, wheelbase length is increased only at the expense of maneuverability. Aisle widths do not usually permit

Practical Pointers For Fork Truck Operators

When you have a heavy load high in the air, think of yourself as a professional juggler. If you could sense the balance of your load just as skillfully as he does, you could probably go 3 times higher in your stacking than anybody else. Now how can these principles be applied?

(1) Never tilt the mast forward when carrying a load in the elevated position. The point of support must be kept under the load for stability.

(2) Never tilt the mast backwards beyond the maximum angle of tilt. Doing this allows the center of gravity to go too far toward the rear, and you lose side stability. The right compromise is to tilt backward a foot or so, or at least far enough so that the deflection of tires, springs, uprights, and other parts of the machine will not allow the back edge of the load to be farther forward than the front face of the drive tires. The juggler's idea is still in force here. You have to keep the load over the point of principal support, the front wheels.

(3) Avoid making a steering turn with the load in the full elevated position, or the truck may turn over sideways. If possible make your turns in the aisle with the load at intermediate height.

(4) Don't accelerate too fast or slam on the brakes too quickly when the load is high. Either operation, may cause the truck to overturn.

(5) Whenever possible, avoid carrying loads at elevated heights.

---

unlimited wheelbase extension.

The weight that can be carried on the rear axle is likewise limited. It is limited not by axle design, but by the effort and the number of hand turns that can be expected of an operator in steering—unless power-steering devices are used.

The design of trucks, therefore, is governed not only by capacity and wheelbase, but also by steering effort and stability. It is generally accepted that steering becomes too difficult for efficient operation when the rear wheel weight exceeds 7500 pounds.

In order not to exceed this figure, and yet include sufficient weight to permit full forward tilt at extreme elevation (in other words, to determine the rear wheel weight required to provide adequate stability under all normal operating conditions) it is necessary first to calculate the overturning moment.

Calculation of Overturning Moment

An overhanging load on a fork truck creates a forward overturning tendency. This tendency may be calculated by multiplying the load weight by the distance from the fulcrum point at the center of the forward wheels to the load, when elevated and fully tilted forward. The product of this multiplication is called the overturning moment, and is expressed in units of inch-pounds.

For convenience in calculation, overturning moment is divided into three parts: (1) load, (2) loss and (3) tilt moments.

Load moment is the product of the load weight multiplied by one half of the load length, measured parallel to the forks. Load moment is one of the terms commonly used to define the capacity of a fork truck.

Loss moment is the product of the load weight multiplied by the distance from the fork face to the drive wheel center, measured with the mast in a vertical position. This dimension is a constant for any one truck model.

Tilt moment is the product of the gross weight of the pay load, times the maximum fork elevation, times the sine of the forward tilt angle. This value is approximate because the height is measured to the fork level rather than to the vertical center of the load. However, it is accurate enough for all practical purposes.

The load, loss and tilt moments added together produce the total overturning moment. In these calculations, all weights must be in pounds and all dimensions in inches. *(This data is shown pictorially in Fig. 2.)*

With this basic data let us determine the trail weight necessary on a properly-designed fork truck bearing a nameplate rating of 144,000 inch-pounds, handling a 6000 pound, 48 inch long load. The truck is assumed to be a standard model lifting to a height of 115 inches with a forward tilt of 5 degrees. The manufacturer's literature specifies a 54 inch wheelbase, with 18 inches from the fork face, or back end of the load, to the drive wheel center. *(See Table 1.)*

Calculation of Required Trail Weight

The next step is to calculate the weight subtracted from the rear wheels under these conditions. This is done by dividing the overturning moment by the truck wheelbase. The amount of weight subtracted from the rear wheels is therefore:

$$\text{O.M} = \frac{312{,}375}{54 \text{ in.}} = 5785 \text{ lb}$$

The questions which naturally follow are: Is this weight adequate for safe operation under all normal conditions? If not, how much ad-

TABLE 1

Overturning Moment (O.M.) = Load Moment + Loss Moment + Tilt Moment, where:

$\text{Load Moment} = W \times \frac{L}{2}$

$\text{Loss Moment} = W \times D$

$\text{Tilt Moment} = W \times \sin \Theta \times E$

W = load weight, lb.

L = load length, in.

D = distance from fork face to drive wheel center, in.

E = maximum fork elevation, in.

Θ = angle of forward tilt, deg.

Calculations are as follows:

$$\text{Load Moment} = W \times \frac{L}{2} = 6000 \text{ lb} \times \frac{48 \text{ in.}}{2} = 144{,}000 \text{ in.-lb}$$

$\text{Loss Moment} = W \times D = 6000 \text{ lb} \times 18 \text{ in.} = 108{,}000 \text{ in.-lb}$

$\text{Tilt Moment} = W \times \sin \Theta \times E = 6000 \text{ lb} \times 0.0975 \times 115 \text{ in.} = 60{,}375 \text{ in.-lb}$

Therefore, the overturning moment, O.M. = 312,375 in.-lb

ditional weight is required?

Up to this point we have been concerned with static stability only. However, in actual use the truck moves. This movement may include bringing the truck to a quick stop when carrying the load at slightly elevated position, or cautious maneuvering as required in tiering operations. It must not include traveling at full speed with the load elevated—a practice prohibited by all safety programs. The additional dynamic forces produced by movement require additional weight on the rear wheels.

Dynamic forces are more difficult to determine than simple overturning moments. They require knowledge of the exact location of the combined center of gravity of truck and load as well as the exact rate of deceleration. However, when stacking is done up to 12 feet—which covers by far the largest percentage of stacking done by trucks today—a simple empirical formula, which works out well in practice, has been developed to take care of these forces. In those rare cases involving higher lifts additional consideration must be given the serious problems of stability created. When elevating up to 12 feet, the additional trail weight required to offset movement forces equals one-tenth of the load weight plus 600 pounds. This 600 pounds is constant, regardless of load weight. Because the example discussed uses a 600 pound load weight, it will require one-tenth of 6000 pounds plus 600 pounds or—1200 pounds. Adding this figure to the previously-determined figure of 5785 pounds, produces the final required trail weight of 6985 pounds.

Inquiry or reference to the manufacturer's literature will now determine whether the truck contemplated meets the performance requirements. In the example given, the required trail weight falls well within the 7500 pound limit required for easy steering.

The purchaser's understanding of truck stability serves two purposes. First, it reminds him to check for maximum loads and tiering height so he can provide accurate informa-

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tion to the truck manufacturer and get the proper truck for his purpose.

Secondly, it enables him to check and compare specifications of competitive trucks. He does not decide in favor of lower cost at the sacrifice of adequate stability.

Analysis also makes it clear that static stability remains constant regardless of how high the load is lifted, when the truck is on a level floor and the mast in a vertical position. Not one inch-pound is added to the overturning moment, nor is one pound subtracted from the trail weight, when loads are lifted straight up. The very slight forward shift in load center due to mast deflection and clearance in the mating mast parts is readily compensated for by tilting the mast.

However, there are certain conditions that throw the mast out of its true vertical position: for example, (1) depression or grade in the floor surface, (2) deflection of the rear springs, and (3) any "whipping" of the uprights or shifting of the bearings while under load. Obviously these factors must also be considered when computing fork truck stability.

Pictures by courtesy of Mercury Manufacturing Co.

Value of Standards

"STANDARDS Are Your Business," a 24-page booklet defining standards of production and their value as tools of management, appears in a new, revised edition just issued by the American Standards Association to emphasize the economic importance of standardization.

The booklet gives the philosophy and objectives of the voluntary standards movement in this country and contains considerable new material, including a section on Federal Government policy toward industry standards. Included are specific examples of recent savings through standardization.

Copies are available without charge from the American Standards Association, 70 East Forty-fifth Street, New York 17, N. Y.

AN AWARD plaque was presented to the management and employees of Daystrom Instrument Division, Archbold, Pa. on Oct. 13 by its insurance carrier for the completion of 1 million manhours of exposure. So far, the company has worked a total of 4,030,655 manhours in its new plant with 4 lost time injuries.

The plant has worked 2 million "accident free" manhours since Jan. 25, 1953 and has received the National Safety Council's Award of Merit for this achievement.

Daystrom, which manufactures heavy electrical implements, has also received safety recognition from the Pennsylvania Dept. of Labor and Industry for 1951 and 1952.

FOUR plants of the Westinghouse Electric Corporation compiled a perfect safety record for the first 6 months of 1953. Two plants won the Award of Honor and seven others earned the Award of Merit presented by the National Safety Council.

Company plants with perfect half-year safety records are: Television and Radio Division plant at Sunbury, Pa.; Eastern District manufacturing and repair department with units at Hillside, N. J., and at Buffalo and Utica, N. Y.; the Westinghouse Printing and Publications Division, Trafford, Pa.; and the newly-completed Columbus, Ohio plant of the Appliance Division.

For accident-free operation totaling more than 3 million man-hours, the National Safety Council presented an Award of Honor to Westinghouse plants at Lima and Mansfield, Ohio. A Council Award of Merit for over 1 million injury-free man-hours was won by the Atomic Power Division in Pittsburgh, and by manufacturing plants at Baltimore, Buffalo, Kansas City, Newark, and Lansdowne and Sharon, Pa.

The Television and Radio Division plant at Sunbury, Pa., in posting a half-year perfect safety record, is nearing its sixth consecutive anniversary. Sunbury employes have now worked approximately 17 million man-hours without a disabling injury. The report also revealed that the frequency of injuries within the Company have been reduced by 15 percent, compared to the first half of 1952.

MONSANTO Chemical Company's plant at Long Beach, Calif., finished first in Group III (small plants) in the company's regular plant inspection competition. The competition is based on reports made by an inspection committee, involving excellence in safety, maintenance of equipment, plant housekeeping and a number of similar factors. The plants are divided into groups according to size. The Trenton, Mich., plant holds the current award for Group II and Texas City, Tex., presently flies the Group I pennant.

Other plants in Group III judged to be above standard, included Monsanto plants located at Vancouver, Canada; Mexico City, Mexico; and Norfolk, Va.

THE Baltimore and Ohio Railroad received an E. H. Harriman Memorial Award for outstanding safety performance among Eastern railroads. President Howard E. Simpson accepted the award certificate at a dinner meeting of the American Museum of Safety in New York.

The awards are made annually, using a formula that considers employee accidents as well as casualties among passengers, trespassers and

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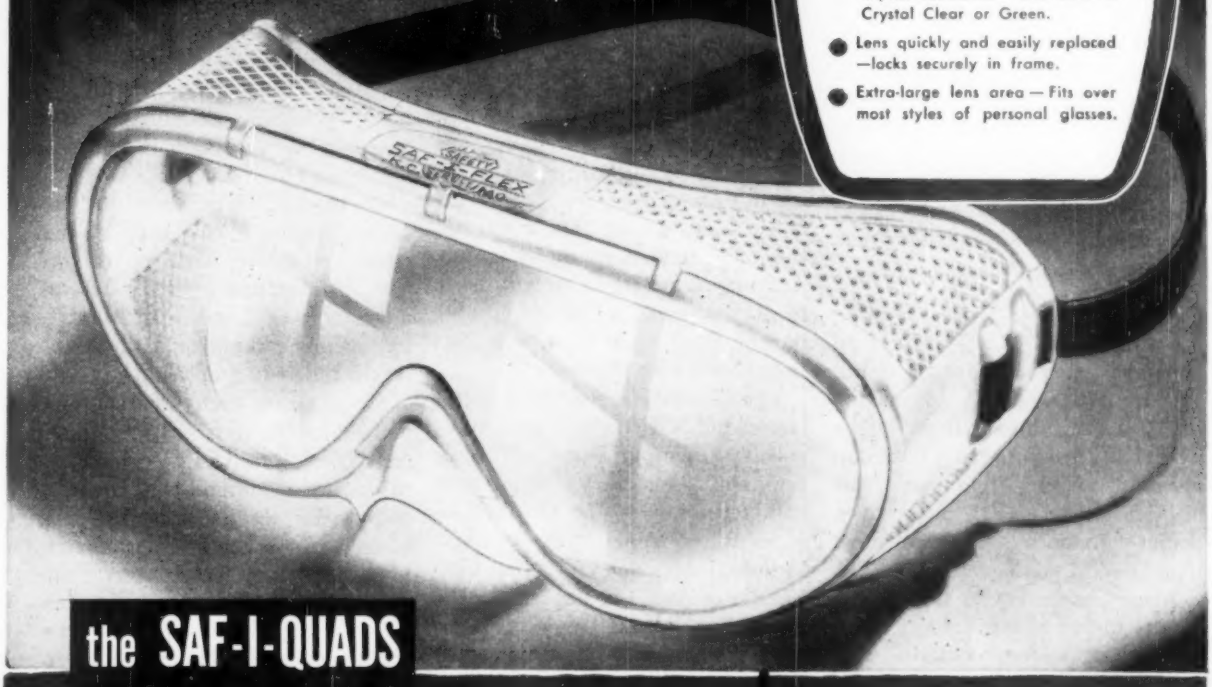

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other persons injured on railroad property.

The B & O's employee injury rate has been reduced 45 per cent since 1948 when an expanded safety program was initiated, Mr. Simpson pointed out.

SEVEN years without a disabling accident was the record established by the 300 men and women of United States Rubber Co.'s Scottsville plant. Since the tire cord plant was built in 1946, its employees have worked a total of more than 4,000,000 man-hours with a perfect safety record.

The Scottsville plant is one of eight mills operated by the company's textile division. It converts rayon yarn into fabric for the company's tires. During the plant's 7 years of operation it has received 18 national, state and company safety awards.

THE Hobbs Manufacturing Company of Fort Worth, manufacturer of trailers, has distinguished itself not only by making them, but by driving them safely. The Hobbs truck fleet has just completed its second million-mile year of delivering trailers and truck bodies without an accident of more than minor consequence. In the two-year period, Hobbs trucks were a party to five minor mishaps, all of the fender-denting variety, with damage under $20.

The company's safety formula for a small fleet operation consists of having only one driver drive the same truck all the time and of only hiring drivers who are well-known to Hobbs. In this way, the company knows its drivers and the drivers know their trucks.

Each truck, when it comes in from a run, is thoroughly checked by a mechanic, and defects noted by the driver are written up. Frequently, the driver is able to spot something wrong before it becomes a hazard, because of his familiarity with the equipment.

The drivers work on a schedule of 10 hours' driving and eight hours' rest, with a maximum of 70 hours of driving in an eight-day period. A driver who drinks is automatically no longer an employee. Courtesy and safety are constantly stressed in the Hobbs transportation department, and the saying around the garage is that each driver before departing on a trip takes on a full load of gas, oil and safety.

THE Mobile, Alabama, plant of American Cyanamid Company has been awarded the firm's President's Safety Award bronze plaque in recognition of its safety record. The plant has operated from September 19, 1944, to September 1, 1953, without a disabling injury. The plant is engaged in the manufacture of commercial alum and sulfuric acid.

THE Norfolk Naval Supply Center has been presented with its seventh consecutive Secretary of the Navy Safety Award. The Center is the only Bureau of Supplies and Accounts activity ever to win seven of these awards (1946-1953) and one of three such winners in the entire Navy Department.

The Center also holds the Secretary of the Navy's motor vehicle accident prevention award. In addition, approximately 300 supervisors with records of up to 11 years' of accident-free supervision, received Industrial Accident Prevention Certificates of Award at the last presentation (for the year 1951).

This record can be attributed to the safety-consciousness of the Center's personnel and its rigidly supervised safety program. Established in 1946, the safety program is directed by W. W. Kelley, safety engineer, under the Industrial Relations Department.

The first step in the establishment of the program, was an inspection of all operations. Guards were designed for machines not already protected, and recommendations were made for the correction of unsafe conditions such as poor light, exhaust system, and unsafe elevators.

Following this, a safety order clearly defining the responsibility of all levels of supervision for the overall safety program was set up. Safety orders were issued to cover hazardous operations and materials.

All supervisors are given a course in safety each quarter. The safety engineer goes into the field quarterly to talk to groups of employees on the job about accidents and their prevention. Supervisors give weekly standup safety talks based on topics and factual outlines supplied by the safety division.

Monthly inspections are made of all areas of the Center except the waterfront which is inspected daily. Unsafe conditions or acts noted by inspectors are reported for corrective action.

All operators of industrial equipment, crane operators and chauffeurs take annual physical examinations. Quarterly examinations are given persons working with lead and other hazardous materials.

Centerwide cooperation in the safety program is evidenced by the safety committee made up of top level management. Safety recommendations and orders are submitted by this committee to the Center's commanding officer.

In addition, each Center component has its own safety committee. The committees meet monthly to discuss conditions in their areas and make recommendations and correct unsafe conditions and acts. Each work area has a safety committeeman who works with the men in correcting unsafe acts and reporting unsafe conditions to supervisors.

IN an informal ceremony in the offices of The Davison Chemical Corporation, George W. Elste, president of the Baltimore Safety Council, on behalf of the National Safety Council presented an award of merit to "The Davison Sentinel," the company's safety magazine for employees, in recognition of "exceptional service in the promotion of safety." This is the second consecutive year the award has been given.

Publication of the "Sentinel" is an element in a diversified safety program which in one year earned the company 35 awards from four national organizations.

TRANSPORTATION SAFETY

Traffic Engineering Book

A COMPLETELY revised and greatly expanded edition of the "Manual of Traffic Engineering Studies," the only comprehensive reference book providing a factual approach to the solution of traffic problems, is now available. The book, treating on the methods, forms and analysis of traffic studies in clear and understandable language, has been written and reviewed by nationally known traffic and transportation engineers. It has been planned as an indispensable everyday guidebook in the treatment of traffic ills by police, traffic engineers, planners and transportation officials, and as a text for students.

Studies covered include accident records and facts; high accident frequency locations; driver observance of stop signs, speed reduction signs and traffic signals; motor vehicle occupancy, volume and volume capacity; cordon count; pedestrian volume; transit loading, boarding and alighting, and speed and delay.

Other studies treated include motor vehicle spot and overall route speed; major route congestion; through traffic; origin and destination; business district two-man parking check; parking inventory; street and off-street parking; employee and customer parking; parker and business district questionnaires; parking lot analysis, and staggered hours.

The new Manual is obtainable from the Association of Casualty and Surety Companies, 60 John Street, New York 38, N. Y., at $3.75 per copy in quantities under ten, or $3.30 per copy if more than ten are ordered.

HOW DRIVER ATTITUDES CAUSE MANY ACCIDENTS

By GLEN U. CLEETON
Dean, Humanistic and Social Studies
Carnegie Institute of Technology

ACCIDENTS are not a matter of chance—they are caused. From the results of safety programs in industry, it is evident that, by determining and correcting causal factors, accidents can be prevented.

The causal elements in traffic accidents are related to (a) material factors such as the highway, the street, the vehicle of transportation, the weather, and other environmental factors, and (b) human factors such as aptitude, knowledge, skill, alertness, and both persisting and fluctuating attitudes of the individual driver.

Recent research studies have shown that the attitude of the vehicle operator is far more important than ordinarily considered. But problems relating to driver attitude cannot be as concretely defined as those relating to the highway and the vehicle which the driver operates.

Furthermore, appropriate attitudes tend to prevent accidents only when other human factors such as knowledge, skill, and aptitude are likewise favorable to accident-free vehicular operation. Consequently, our first step in dealing with attitudes of the driver may well be one of raising the question of how well vehicle operators understand the wide range of elements which relate to accident causation.

In familiarizing the vehicle operator with the causes of accidents, we must not overlook the fact that from an engineering standpoint the operation of vehicles on highways and city streets involves two objectives: safety of operation and effective traffic flow. Consequently, in promoting highway safety, the problem is not only one of making certain that all factors involved facilitate safe vehicle operation but—*and this is equally important*—smooth and continuous traffic flow must be attained.

In promoting traffic safety along with desired vehicular movement, the elements requiring investigation are: 1. The roadway or street, 2. The vehicles using the roadway, 3. Overloading and congestion of arteries of traffic, 4. Use of the roadway by multi-unit and multi-controlled vehicles, 5. Weather conditions, 6. Driver observation of the rules of the road, 7. Driver knowledge and skills, 8. Driver limitations—physical, mental, emotional, 9. Influence on the driver of intoxicants, drugs, illness, and fatigue, 10. Special privilege drivers.

Three Kinds of Accidents

In developing safe driver *attitudes*, we must emphasize *awareness* and *alertness* in relation to the ten major elements of accident causation. In doing this, we must recognize that there are, at least theoretically, three kinds of accidents: (a) the accident that has occurred and may be repeated; (b) the "acci-

dent" that almost occurred but did not happen; (c) the "accident" which is "waiting to happen." In other words, (a) we must prevent the recurrence of *an accident which is a matter of record;* (b) we must learn to eliminate *the accident that might have happened;* and (c) we must provide safeguards against *the accident which may happen.*

A study of the major elements relating to safety of operation reveals a wide variety of factors relating to accident causation, which may be classified as shown in Table 1, under main headings as indicated.

The extent to which human factors are causal elements in accidents has been variously estimated. Some analysts who are conservative in their estimates say that at least 50% of accidents are due to human failures. Others go so far as to say that 80% of accidents on the highway could be prevented if the human factors could be appropriately controlled.

TABLE 1

1. The roadway or street.
   (a) Its construction and condition.
   (b) Its markings, signs, and signals.
   (c) The adjoining right of way.
   (d) The adjoining property or landscape.
2. The vehicles using the roadway.
   (a) Their control features and their condition.
   (b) Their suitability to the roadway.
   (c) Their suitability to each other.
3. Overloading and congestion of arteries of traffic.
   (a) Frequently recurring (daily) rush or peak hour loads.
   (b) Weekend and holiday congestion.
   (c) Assemblage and dispersion of crowds.
4. Use of the roadway by multi-unit and multi-controlled vehicles.
   (a) Trailer trucks.
   (b) Towed units.
   (c) Car and trailer.
   (d) Passenger car with back-seat driver.
5. Weather conditions.
   (a) Rain.
   (b) Snow.
   (c) Sleet and ice.
   (d) Fog.
   (e) Darkness (adaptation).
   (f) Sun glare (adaptation).
6. Driver observation of the rules of the road.
   (a) Legal restrictions.
   (b) Conventions of operation.
   (c) Practices arising out of courteous consideration of drivers for each other.
7. Driver knowledge and skills.
   (a) Knowledge of the operating features of the vehicle being driven.
   (b) Knowledge of the rules of the road.
   (c) Skill in maneuvering the vehicle.
   (d) Response habits in driving.
8. Driver limitations—physical, mental, emotional.
   (a) Reaction time.
   (b) Coordinative responsiveness.
   (c) Perseveration—both physical and psychological.
   (d) Visual acuity.
   (e) Ability to learn.
   (f) Ability to judge and choose.
   (g) Ability to adjust.
   (h) Tendency to react to fear or anger.
   (i) Attitudes.
   (j) Physical defects.
9. Influence of intoxicants, drugs, illness, and fatigue.
   (a) Individual habits.
   (b) Tolerance differences.
   (c) Effects of medication.
   (d) Drug addiction.
   (e) Temporary or permanent ailments.
   (f) Effects of continuous driving.
   (g) Fatigue recovery.
10. Special privilege drivers.
   (a) Fire trucks.
   (b) Police units.
   (c) Ambulances.
   (d) Mail trucks and special delivery cars.
   (e) Motorcycles.
   (f) Children (and sometimes adults) on bicycles.
   (g) Certain taxi, truck, and passenger car drivers who assume special privileges.

While the results of research on the human factor in highway accident causation are fragmentary, attempts have been made to summarize such findings. These findings are transmitted with the understanding that they represent qualified estimates rather than exact research data. The elements which lead the list of human limitations in vehicular accident occurrence are faulty attitude, impulsiveness, irresponsibility, and emotional disturbances. The percentages attributed to these factors are:

Faulty attitude	14%
Impulsiveness	10
Irresponsibility	8
Nervousness and fear	6
Worry and depression	2
Total	40%

Closely related to these factors are the elements of judgment, attention, and concentration, with the following percentages:

Failing to recognize potential hazards	12%
Faulty judgment of speed or distance	12
Failing to keep constant attention	8
Improper distribution of attention	2
Total	34%

The two preceding groups cover 74% of accidents due to human failures. Of the remaining 26%, sixteen per cent are attributed to faulty vision, physical defects, disease, and other elements relating to physical capability. If these percentages are correct, then only 12% of accidents could be attributed to lack of knowledge or operating skill, indicating that attitude, state of mind, and judgment are the basis of a very high proportion of highway accidents.

Safe Driver Attitudes

Supplementing the findings of controlled investigations of driver attitudes, there are a number of

"common sense" observations about the relation to highway safety of driver attitudes and the operating practices which they engender. The most important among these are:

(1) In terms of skill and knowledge, the safe driver is fully equipped to operate his vehicle.

(2) The safe driver keeps his car under control at all times. He not only observes legal restrictions, but keeps himself alert and ready to bring his vehicle under controls in emergencies. He makes certain that the control features are in good operating order before he attempts to place the vehicle on the road.

(3) The safe driver observes road and weather conditions and makes allowance for them in planning his trip and in maneuvering his vehicle.

(4) The safe driver thinks signals are important. He believes in signalling to other drivers his intentions and, after signalling, believes he has an obligation to act accordingly. Furthermore, he observes road signs, traffic signals, and markings.

(5) The safe driver is constantly thinking about other users of the highway or street, and tries to anticipate what they are likely to do. A good attitude to cultivate is that of not only driving his own vehicle, but "driving" the other fellow's as well.

(6) The safe driver does not respond violently to frustration and anger. He realizes that inevitably there will be a certain percentage of smart alecks, dumbbells, show-offs, and speed demons among any group of drivers. The appropriate attitude to take while using the highway is that these misfits are part of the traffic scene, and that any attempts to bring them under control should be made at times when not driving, rather than when using the traffic arteries.

(7) The safe driver does not try to teach the other fellow how to drive while in the process of driving his own vehicle.

(8) The safe driver is a courteous driver.

(9) The safe driver keeps the safety objective ahead of the desire to establish a time record. That this attitude is hard to achieve is demonstrated by the fact that we frequently hear people brag about the limited time elapsed in getting from one point to another, and seldom hear anyone brag about arriving at his destination without mishap.

(10) The safe driver will not operate his vehicle when under the influence of intoxicants, drugs, illness, or fatigue.

(11) The safe driver does not abuse special privileges accorded him because of the special vehicle being driven. Instead, if he is an operator of a multi-unit or a multi-controlled vehicle, or a special unit such as a fire truck or ambulance, he exercises more than the usual caution in threading his way through traffic.

(12) The safe driver gives the pedestrian a break.

(Continued on page 56)

GET THE FACTS ABOUT—

Lightfoot TREET

POWDERED SKIN CLEANSER

THE MOST EFFICIENT SKIN CLEANSER MADE!

A HEAVY DUTY SKIN-CLEANSER without a peer in the industrial field. It has a high anhydrous content and is superfatted for extra mildness. This super mild soap is scientifically blended with an edible corn meal scrubber and a special skin emollient to give thorough, safe cleansing to the dirtiest hands.

COMMODORE—Same formula as "Treet" but extra coarse. Ideal for those who prefer a "rough feeling" soap, yet one that will leave the skin soft and smooth.

An Invitation—We will be glad to send detailed information and prices on these products, and invite you to ask for free sample quantities. No obligation, of course.

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"24 HOUR" DEODORANT SOAP
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(For further details, use Key # L-17 on free Inquiry Card on page 69)

The hard school of experience has taught many executives an important business lesson: It is more profitable to *rent* than to *buy* industrial work garments.

Renting—saves you time—increases profit. No maintenance or replacement worries and rented uniforms are Safe uniforms! Find out today why so many men have stopped buying and started renting. Write to the:

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(Use Key # L-18 on Inquiry Card on page 69)

"What's the Law?"

Edited by
HENRY M. GROSMAN
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Master Superior Court, New Jersey
Member, American Bar Ass'n
Member, New Jersey Bar Ass'n
Member, National Federation Insurance Council
Past Commander, American Legion, Post 10, Newark, N. J.

COURT DECISIONS

Epileptic Seizures Lead to Accident Not Compensable

HAROLD HENDERSON suffered from epileptic seizures about every other month. In proceeding about his customary duties in the factory, he suddenly and without forewarning suffered a seizure while walking on a level concrete floor. Henderson fell to the floor and struck his head thereon at the climax of the fall.

There is no evidence that the seizure was even partially caused by the employment nor did the employee so contend.

The accident did not arise out of the employment and is therefore not compensable.

Henderson vs. Celanese Corp., 27 N. J. Super. 219 (1953).

Compositor Suffers Cancerous Growth—Non-Compensable

While working as a compositor for a printing company, Mack Carroll had to cut and trim copper and zinc plates with a power saw. During the cutting and trimming process, fine splinters of metal would be thrown off and come in contact with his nose or ears or other parts of the body. Carroll had been hired and working for 12 years prior to the alleged time of the accident at this work.

On January 2nd or 3rd, 1951, he noticed a slight swelling on the edge of his nose. Thinking that it was a hair, he pulled it out and it bled a little. On January 6th, he visited a doctor who diagnosed it as a small cancerous growth (epithelioma). It was removed by surgery and x-ray treatment administered.

This matter was held non-compensable as the evidence failed to establish that the employee had suffered an accidental injury arising out of and during the course of his employment.

Carroll vs. Newark Printing Co., 25 N. J. Super. 528 (1953).

Intoxicated—Yet Compensable

"An intoxicated person, asleep in the rear of an automobile at the time of an accident, cannot be guilty of conduct proximately causing his injuries in such accident." So states Honorable J. Moore of the Colorado Supreme Court in reviewing the case of Stearns-Roger Mfg. Co., vs. Castell.

The injured employee, Castell, was a steamfitter who had been sent by the local union to an out-of-town job. By prior arrangement, the employer paid the employees sent out by the union the going scale of wage for the travel time and necessary expenses.

In the course of the travel, the injured along with another steamfitter, stopped for lunch and also purchased a one-fifth of liquor. Each had several drinks and as they proceeded toward their destination, the driver lost control of the car. In the accident which resulted, Castell suffered multiple fractures and the loss of his right ear.

Even though the injured employee was drinking with the driver while en route, he could not be charged with the negligence of the driver.

This case was held compensable by the Compensation Commission, the District Court affirmed the

award, and the Supreme Court held for the injured steamfitter on the appeal.

Stearns-Roger Manufacturing Co. vs. Castell, Colorado Supreme Court, No. 17,155, Sept. 21, 1953.

Particles Cause Loss of Eye

In the course of his employment, an employee was required to pick up scrap in his employer's yard. On the date of the injury, Justice was in the act of picking up scrap. Suddenly a strong wind blew particles of dust and crushed rock into his eyes when a fellow workman attempted to throw a scoop full of debris into a wagon.

An inflammation developed in the left eye and eventually the eye had to be removed. Because of a prior accident to his right eye, he suffered a visual acuity loss of 64.25%. The total impairment now of the visual efficiency of both eyes was 73.19%. (Held compensable.)

Justice vs. Continental Can Co., Kansas Supreme Court, No. 39,044, May 21, 1953.

Unusual Exertion Caused Death Held Compensable

Bingold, worked as a painter's helper. In May, 1948, he suffered a heart attack and the employer, Krebs knew of this. It was understood that Bingold was to take it easy and to do light work only. Nevertheless, on February 14, 1949, the employer had him help load a truck, in the course of which he carried 40 pounds of material, and four or five 1- or 2-gallon cans of paint. The unusual exertion caused Bingold to have an attack from which he died within an hour.

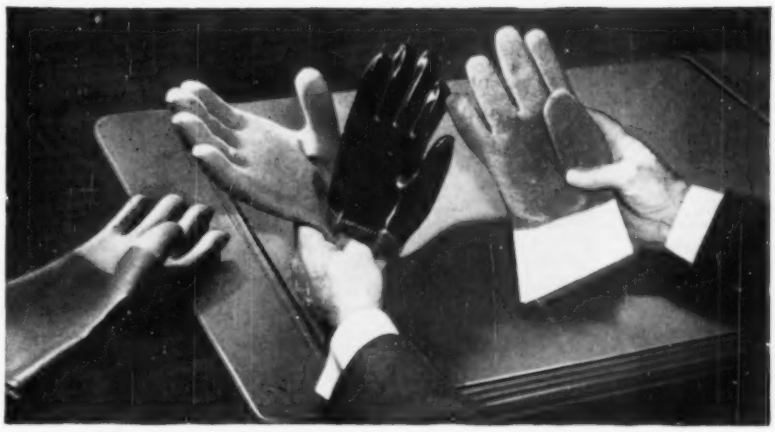
This case was held compensable, the attack being caused by the unusual strain.

Bingold vs. Krebs, N. Y. Supreme Court, Appellate Division, 3rd Judicial Dept., No. 149-19, July 2, 1953.

AVOIDABLE ACCIDENTS

Claimant stated that he climbed into back of his ice-cream truck and

Why does management care what gloves employees wear?



Specifying job-fitted gloves results in:

Fewer lost-time accidents.
Better work handling. Less spoilage.
Improved job attitude.
40% to 70% average saving in glove costs to companies or employees.

CASE No. 418 — Problem: Protecting broach rotor core operator from wet broach and from rotor coolant carrying sharp slivers which caused severe cutting and puncturing.

Solution: Gloves with extra thick coating of specially reinforced neoprene. Wore 5 *times longer* than best gloves previously tested.

No. 930: Coated with extra duty red NEOX (reinforced neoprene).

CASE No. 198 — Problem: Handling sharp-edged sheet metal in shearing operation.

Solution: Job-fitted gloves with cut-resisting reinforced neoprene coating on palm. Proved safer, more comfortable and wore 200 hours compared with 40 hours average of canvas, leather and plastic-coated gloves.

No. 93: Palm coated with black NEOX (reinforced neoprene).

CASE No. 246 — Problem: Handling rough logs, sawing and stacking lumber.

Solution: Job-fitted plastic-coated gloves eliminated injuries from splinters and wore a minimum of 30 days against 2 days' wear of best quality canvas and double-palm gloves.

No. 366: Coated with DUROX, a 50% longer wearing plastic. Grips wet or dry.

Our laboratory and field representatives will gladly assist on any protection problem: (Used by Republic Steel, Chevrolet, Firestone, Monsanto, Chrysler, Carnation Milk, many others.)

Sample gloves supplied without charge for testing on your operations. On request, we make recommendations and also develop special gloves where needed. Address "Safety Engineering Service, Edmont Mfg. Co., 1256 Walnut Street, Coshocton, Ohio."

Edmont job-fitted work gloves

by the world's largest maker of coated industrial gloves

(For further details, use Key # L-19 on free Inquiry Card on page 69)

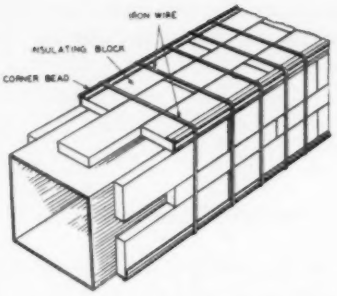
the door slammed shut. He stated that although there is a wrench on the inside of the truck to enable him to open the door—the wrench was not there.

Truck was also equipped with chain on door which would keep door from shutting, but he did not use the chain.

Result—Claimant was unconscious when removed from truck and suffered frostbite of extremities and neurosis. Claimed he is nervous, gets nightmares and is afraid of the dark. All this could have been avoided—don't you agree?

☆ ☆ ☆

NOTE: The editor will publish cases of avoidable accidents giving due credit to the person and firm sending them in. Let's hear your experiences.



To insulate ducts, 85 percent magnesia blocks are held by annealed iron wire. Corner bead keeps wire from cutting insulation.

Insulated Ductwork Reduces Fire Hazard

HOT gases passing through uninsulated ductwork have in many cases ignited surrounding flammable building materials. By applying suitable thermal insulation, this fire hazard can be effectively controlled.

Because grease-laden fumes represent an even greater danger, particular attention should be directed to kitchen range hood exhausts in hotels, restaurants, hospitals, and industrial plant or school cafeterias. These are usually insulated with 85 percent magnesia blocks ranging from 1 inch to 2 inches in thickness. By keeping the vapors hot, the insulation reduces the danger of flash fires. In addition, should a fire occur inside the duct, the insulation will confine the heat and protect adjacent combustible materials.

An example of this fire preventive measure can be found at the new Carlton House, successor to the Ritz-Carlton Hotel in New York. Blocks of 85 percent magnesia, 1 inch thick, have been secured to the kitchen exhaust ductwork with 16-gage annealed iron wire. Metal beading at the corner prevents cutting the insulation. Hexagonal wire mesh is stretched taut over the blocks, and ¼ inch layers of asbestos insulating and asbestos hard finish cement troweled on. A pasted jacket of canvas completes the protective covering.

Picture by courtesy of The Magnesia Insulation Manufacturers' Association.

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STAY FRESH

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Dupor No. 40
The Respirator That is U.S.B. of M. Approved for Type A Dusts

Guards against pneumoconiosis and silicosis producing dusts. Has over 40 sq. in. twin filter area. Sanitary face cloth. Soft rubber face mask. "Controlled breathing" valves. Wearer has a panorama view with no blind spots. Unusual rubber, felt and plastic construction makes it extra durable, no denting or bending possible. Efficiency remains unimpaired even after rough treatment.

Sample sent $3.00pp

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Double filters provide easy breathing. Soft rubber face mask gives air-tight fit. Sanitary face cloth protects against dermatitis or chafing. Has patented DUPOR valves for "controlled breathing," and panorama view without blind spots. A prime favorite for years!

Sample sent $2.00pp

For the best in eye protection get H. S. Cover's Gas-Tight, Fog-Proof Goggles.. $2.00 pp

H. S. COVER, South Bend, Ind.

(For further details, use Key # L-20 on free Inquiry Card on page 69)

Industrial Hygiene

Associate Editor
Jacob A. Goldberg, A.M., Ph.D.

Hearts-In-Industry Conference

A CONFERENCE to discuss the problems of management and labor in employment of persons with heart disease will be sponsored by the New York Heart Association this month, according to an announcement by Dr. John H. Keating, president of the Association.

Leading heart specialists, industrialists, and labor, insurance and government representatives will participate in the one-day "Heart-in-Industry" conference to be held November 20 at the Statler Hotel in New York City.

The conference, seeking to increase employment of cardiacs, and their placement in jobs they can handle, will discuss the problem as it relates to management, labor unions, insurance companies and government compensation agencies.

"We are now able to dispel, by reason of new scientific knowledge, many misconceptions of the physical capacities of the worker with heart disease," Dr. Keating said. "We hope to be able to bring wide public attention to the fact that the man who has heart disease is not a hopeless cripple, but can be a full-time productive worker, provided he is in the right job."

Another problem for conference discussion will be the groundless fears of many a heart sufferer who, himself, must frequently be made to realize that he can work. Other topics to be aired by experts in the field will be: industrial insurance and government compensation laws.

Radiation Decontamination Study

THE first public announcement of the results of a 2-year research program on cleaning surfaces contaminated with radioactive debris has been made by Dr. Foster D. Snell, president of the consulting chemical firm of Foster D. Snell, Inc. Such decontamination is necessary in the many laboratories working with radioactive isotopes, called in the vernacular "hot" labs, and will be necessary on a large scale in case of explosion of an atomic bomb at or near a populated area.

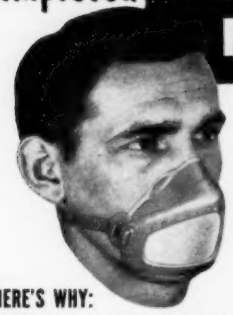
When an atomic bomb is exploded, the smoke and dust in the air take up the radioactive materials. This radioactive smoke and dust can be dispersed by the wind over wide areas before settling. On the occasion of the explosion last April 25th at Yucca Flat, Nevada, the drift of the atomic cloud over New York City 4 days later raised the radiation level to the point where Dr. Snell reports the company's "hot" laboratory had to be shut down for a day. This cloud represents no hazard to humans, but illustrates how far the atomic debris is carried.

The recent explosion at Yucca Flat brought out another very important point of interest to the public and to Civil Defense Officials. After that explosion, the press carried the story of the necessity for decontaminating 4 cars and a bus after the April explosion and nearly 100 cars after the May explosion. It follows that any structures at the same relative location would have been contaminated. Such surfaces must be decontaminated before they are safe for use or occupancy. The results of the study show that the major part of the decontamination can be done by anyone if necessary, using largely materials from the kitchen shelf, products purchased at the corner grocery or supermarket. Some surfaces, notably plaster, require special treatment.

The nature of the fission products—new atoms produced by the explosion—depends on the time which has elapsed since the explosion and the type of bomb used. Chemically the atoms present are largely in the group from yttrium to europium, usually called rare earths.

(Continued on next page)

THE Improved FLEX-A-FOAM FILTER MASK



Your best ounce of protection against IRRITATING DUST

HERE'S WHY:

★ **Workers wear it** Lightweight (just 1 ounce), snug, comfortable and easy-to-breathe through, Flex-a-Foam is the *one* respirator your workers actually *welcome*.

★ **It's super-efficient** Flex-a-Foam's pure latex filter protects against nuisance dust particles 100 times smaller than the eye can see!

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For the investigation a group of such fission products supplied by the Oak Ridge National Laboratory was incorporated into a synthetic soil representative of the dirt formed by analysis in the air over industrial cities and containing dozens of components. This was applied to such diverse types of surfaces as tin, glass, cement, gypsum plaster, unpainted and painted wood, cotton cloth, and even the shaved skin of rabbits.

After the deposit had been allowed to dry, it was "deterged" by standard technics using commercial soaps, light-duty syndets (synthetic detergents) and heavy-duty detergents. The degree of contamination and removal was measured with the Geiger counter, the same type of instrument used to detect deposits of uranium. It was found that heavy-duty syndets were generally more effective than either light-duty syndets or soap.

That proved to be the clue to efficient removal of fission products. There is a class of chemical compounds known as sequestrants which have the property of "locking up" in the compound many elements such as calcium and magnesium and, fortunately, the rare-earth elements produced as fission products. While there are several of these sequestrants including ethylene diamine tetraacetic acid, pyrophosphates, tripolyphosphates, and even citrates, the most economical to use is a modified form of sodium hexametaphosphate. When two parts of this harmless chemical are mixed with one part of either soap or syndet and applied in one percent solution in water, removal of the radioactive contaminant from nearly all surfaces was nearly complete. An exception was formed in the case of gypsum plaster where removal by plain water was better than with any cleaning agent.

Thus radiological decontamination of any city or town after an atomic burst will present special problems requiring some technical supervision. As a typical example, water removed 47% of the contamination from frosted glass, 1% solution of soap removed 81%, but in admixture with two parts of sodium hexametaphosphate, thus using only one-third as much soap, 98.8% was removed. In general, the harder and smoother the surface, the easier it is to decontaminate. With the exception of plaster, decontamination to better than 90% offers no great difficulties if the appropriate materials are available.

How To Build An Atomic Shelter

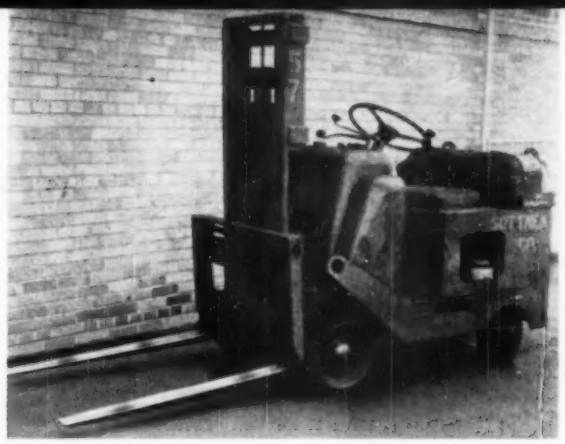
THE Federal Civil Defense Administration says home shelters are low-cost insurance for householders.

In an 86-page manual—complete with "build-it-yourself" drawings and specifications—the agency urges, "If you live within about 10 miles of the downtown area of a major city located in a target area, you should build a shelter for your family."

FCDA is beginning national distribution of a limited quantity of the new manual, "Home Shelters for Fam-

(Continued on page 46)

YOU CAN USE GASOLINE TRUCKS INDOORS, TOO!



Fork lift truck equipped with catalytic exhaust to kill off carbon monoxide and other dangerous exhaust fumes in winter.

THE Jules S. Sottnek Company, Inc., one of New York City's largest stevedores and terminal operators, saved itself thousands of dollars when it converted one of its gasoline-powered fork lift trucks for safe operation indoors. The conversion was made with a comparatively low-cost catalytic exhaust.

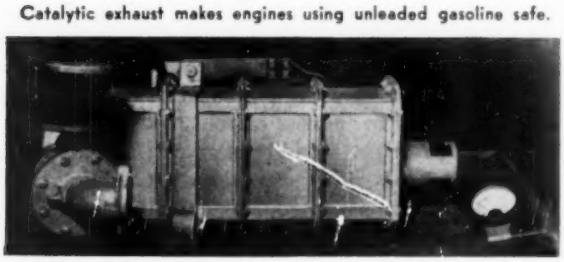
Sottnek operates a large fleet of industrial trucks on seven piers on the Brooklyn and East River water fronts. All of the trucks are powered with gasoline engines.

These trucks originally were purchased for outdoor use where exhaust fumes were of minor importance. When Jules S. Sottnek Company acquired warehouse space off Pier 30 in Brooklyn for winter storage of imported wines and liquors, they were faced with a serious problem. They tried to use one of the smaller fork lift trucks inside the warehouse, but after a short period of operation some men became sick from the accumulation of carbon monoxide in the work area.

The only alternative seemed to be purchase of an electric-powered truck and battery charging equipment. However, E. V. Stoute, assistant vice president of the company, heard about the catalytic exhaust, which eliminates carbon monoxide and other harmful gases in the engine exhaust. He decided to equip his truck with one of these units. A mechanic in his maintenance shop replaced the regular muffler with a catalytic exhaust, and complaints from exhaust fumes disappeared immediately.

The warehouse space is 300 feet long x 50 feet wide x 12 feet high, and, because it is heated during the cold months, has little ventilation. Nevertheless, the fork lift truck equipped with the catalytic exhaust has been used inside the building eight hours daily without any ill effects to workmen.

Catalytic exhaust makes engines using unleaded gasoline safe.



The company uses its warehouse from November through March. During this period the truck is equipped with the catalytic unit and is run on unleaded gas. For outdoor use on docks during the warmer months, the catalytic exhaust is replaced with the regular muffler, and the truck is run on leaded gas. Removal of one unit and installation of the other requires only three hours.

When the catalytic exhaust is in place, the truck can be used in the confined holds of ships without any adverse effects from exhaust gases.

How It Works

Heart of the catalytic exhaust is the cartridge of spaced porcelain rods coated with a catalytic agent—catalytic alumina and platinum alloy. As the engine exhaust flows across the surface of these rods, carbon monoxide and other noxious vapors are oxidized to harmless effluents, mostly carbon dioxide and water vapor. The slight traces of contaminants remaining is far below the U. S. Public Health Service tolerance of 100 parts per million for eight hour exposure and 400 parts per million for one hour exposure.

The exhaust unit can be used on any engine—mobile or stationary—which burns unleaded gas, and it can also be easily adapted to LP engines. It successfully prevents the harmful psychological and physiological symptoms of excess carbon monoxide. These include headaches, eye irritation, nausea, fatigue, drowsiness and—of prime concern to safety—the impairment of reasoning power and judgment.

Besides burning off carbon monoxide, the catalytic exhaust removes objectionable fumes and odors from internal combustion engines. The noise level is equal to that of regular mufflers and back pressure is often less. A temperature indicator shows when the engine needs adjustment; therefore, installation of an exhaust unit frequently results in gas savings.

The catalytic exhausts come in standard sizes for any make or size of fork lift trucks. Space requirements for installation of a unit are approximately the same as for the regular muffler which it replaces.

Pictures by courtesy of Oxy-Catalyst, Inc.

Weapons Against Air Pollution

By NELSON W. HARTZ
Mine Safety Appliances Company
Pittsburgh, Pa.

TODAY the instrument industry is designing and manufacturing devices to detect and measure any and every contaminant in the atmosphere. All are not ideal for the air pollution engineer to use, but fundamental principles are embodied in them.

The majority of these devices were not specifically designed for air analysis. They were originally devised for the chemical or metallurgical laboratory, for weather observers and forecasters or, for people in medical and industrial hygiene.

This situation stems from the fact that, while interest in air pollution is old, the exact requirements for analyzing the atmospheres surrounding our expanding technical civilization have not been sufficiently delineated to guide the instrument industry in designing special instrumentation. Until very recently, the market for such equipment has not been large enough to merit intensive research.

Today, there is little factual information to justify ranking, one above the other, the health, economic, or nuisance aspects of air pollution. The health factor will probably prove to be far more significant than the other two; yet today the soilage of wash on the backyard line, or dirty living room drapes, seem more significant to the citizen who must support an air pollution program than the ultimate effect of contaminated air on his health. The cause and effect are visible and improvement can be conspicuous.

There is strong evidence that long-term exposure to even minute concentrations of certain contaminants in the air may significantly effect large numbers of people, or at least contribute to the deterioration of health of persons who have previously acquired certain diseases. The correlation between exposures and physiological response data will require years of study.

In the meantime, the air pollution engineer must continue to determine the nature and extent of atmospheric pollution upon which to base these studies. Today every effort should be directed to obtain all possible data on the nature and concentration of all contaminants of the atmosphere which, on the basis of present knowledge, may be physiologically significant. Skillfully applied techniques and well recorded results and methods will make the data of great value when efforts are made to relate past exposure to current population health.

There is a tendency to assess atmospheric pollution by relative means, such as filter paper stains, appraised either visually or photo-electrically, or to rely upon accumulation in fall jars and similar devices. This data is helpful in appraising the nuisance value of the problem and in reducing obvious dirt in the atmosphere, but it is questionable whether it will be useful for the long range problem of appraising health hazards.

Testing

Instruments used for measuring and controlling air pollution can be classified by their function. There are those which spot test the atmosphere; those which continuously analyze the atmosphere; those which spot test stack effluents; those which continuously monitor stack effluents; and those used for meteorological studies.

Spot testing the atmosphere is a logical part of a general survey by governmental bodies. Large industrial plants also spot test to determine if they have an air pollution problem; and, if so, to determine its nature, its magnitude, and the existence of any general trends over long intervals. These instruments may make direct analyses or collect samples of air or a concentration of a contaminant for subsequent identification, analysis, or quantitation. Such instrumentation may be intended to appraise gaseous or aerosol contamination or to detect nuclear energy. These tests are usually correlated with meteorological conditions prevailing at the time and sometimes with atmospheric visibility.

If the tests demonstrate a potential contamination problem of long duration, it may be necessary to permanently mount a ***continuous*** or ***intermittent analyzer*** for the specific pollutant. If the contamination can be traced to a particular stack or group of stacks, ***continuously monitoring equipment*** can be installed, so those responsible may be guided to corrective measures.

If the source is to be positively identified as a particular group of stacks it may be necessary to test each to establish the presence and quantity of an undesirable component in the effluent. This produces a need for a ***spot testing device for stack sampling***, as well as continuous analyzers.

In practically every case, correlation of the source or source area with the dissemination or distribution of pollutant must be studied for the normal and the unusual atmospheric conditions. This makes ***meteorological instruments*** a very important part of any program of air pollution measurement and control.

Instruments

Some of the commercial instruments available for spot testing for gaseous contaminants are carbon monoxide testers, indicators and detectors; hydrogen sulphide detectors; hydrocyanic acid gas detectors; aromatic hydrocarbon detectors; nitrogen dioxide detectors; halogen detectors; combustible gas indicators; midget impingers for SO_2, Cl, HCN aldehydes, aromatics, methanol, etc. Mass spectrometers of the permanent magnet, radio frequency, and molecular resonance types are also available.

For detecting aerosol contamination there are electrostatic samplers, impingers; cascade impactors; thermal principitators; filter paper samplers for intermittent and continuous operation; chromic acid mist air samplers and photographic procedures.

Some instruments for continuously sampling the atmosphere for gaseous contamination are the autometer for SO_2, H_2S; the titrilog for H_2S, SO_2; the H_2S recorder using paper stain and photo-electric appraisal; the mercury vapor recorder; the carbon monoxide recorder; combustibles recorder; infra-red analyzers for CO, NH_3, SO_2, oxides of nitrogen, organics; hydrocyanic acid gas recorders; and acrylonitrile recorders.

Aerosol Measurement

For aerosol measurement, specifically dusts and smokes, we have the electrostatic sampler and filter paper collectors of the static, intermittent movement, and continuous movement types. For measurement of aerosol mists there are autometers, titrilogs, electrical conductivity analyzers, and instruments for absorption and subsequent photo-electric measurement.

For stack sampling, either periodically or continuously, instruments for spot testing or continuous monitoring of the general atmosphere are frequently used. In many instances such adaptations are not easy. The problem of obtaining a representative sample from a stack is often far more complicated than identification or quantitation after the sample has been collected. This problem of the air pollution engineer is equally important to the industrial instrumentation engineer. Stack analysis is frequently an important phase of process control, as in the measurement and control of combustion products to maintain plant efficiency.

Stack sampling facilities must be developed that will give due consideration to extremely high gas temperatures, condensation of water vapor, separation of particles from gases, where gases are to be measured, or collection and retention of representative particles, where the latter are significant. While measuring gaseous components of stack gases may be difficult in some situations, collection and measurement of representative samples of aerosols can be tremendously more complex. This is because the kinetic energy of the particles in the gas stream varies with the velocity of stack gases. At present each stack-sampling problem must be considered a separate situation which requires an individual solution.

Auxiliary Instruments

In addition to instruments originally intended for air sampling and adapted to stack sampling, a group of photo-electric smoke alarms, indicators, or recorders have been developed. These may be installed in stacks to advise the stationary engineer when he is generating an excessive concentration of smoke. Optical instruments have also been developed for viewing stacks from a distance to determine excessive contamination of the air.

As more nuclear reactors are established, and as more industrial plants recognize the benefits of radioactive isotope tracer techniques, the importance of the radioactivity hazard will increase. This is one form of air contamination in which instrument development has carried on concurrently with the development of techniques for utilizing the contaminant. Today there is a host of instruments for appraising radioactivity in the atmosphere, ranging from simple photographic plate techniques, through chemical and physical type dosimeters, geiger counters, ionization chambers, counters, rate meters, and many other forms which may be adapted to specific conditions of usage.

None of the devices mentioned in this article are capable of detecting and measuring all contaminants that occur in the air. Few are ideally adapted to atmospheric analyses. The instrument manufacturers, however, stand ready to design, develop, and produce additional types of instruments for appraising air pollution problems as the need for such equipment is established and the requirements clarified.

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(For further details, use Key # L-23 on free Inquiry Card on page 69)

Atomic Shelter ***(From page 42)***

ily Protection in an Atomic Attack," fifth in a series on structural protection against atomic blast.

In announcing the publication, Governor Val Peterson, FCDA Administrator, says, "the release of this manual, the result of several years of scientific research culminating in the recent Yucca Flat tests, is a milestone in civil defense.

Four types of shelters, all tested under atomic blast, are described in the booklet, covered-trench and basement-exit types for out-of-doors, and lean-to and corner-room types for basements.

"A house with a basement which extends five feet or more below the ground level has a certain amount of inherent protection," the manual says. "This protection is not enough to make a basement a wholly satisfactory shelter area without improvement, but is enough to make the basement safer than any other part of the house provided there is an outside exit."

Cheapest of the shelters to build is the basement lean-to. The FCDA estimates that it can be built for about $10 per occupant ($40 minimum) if wooden materials are used or about $16 per occupant ($65 for family of 4) if the shelter is built with reinforced concrete. A more comfortable indoor shelter is the corner-room type, which the agency estimates would cost about $24 per occupant to build.

The outdoor types of shelter are generally safer. Least expensive is the covered-trench, a box or tunnel type structure covered with three feet of earth. The cost is estimated at about $30 per occupant. Most expensive is the basement-exit shelter, but it has advantages in security and comfort that none of the others has. Its construction may require the services of an experienced contractor and skilled workmen. Costs would vary with the dimensions, building conditions and the section of the country.

The drawings, for both amateur and professional builders, are accompanied by lists of materials and tools needed to construct the shelters. Rapid sequence photographs of the houses exposed to the A-bomb tests at Yucca Flat, Nev., March 17, 1953, illustrate the need of shelters described in the manual.

Chief danger in an atomic blast, the booklet warns, is blast, not radiation. At seven-eighths of a mile, it says, the wall of a well-built brick house will give adequate radiation protection from a bomb two and one-half times as powerful as those dropped on Nagasaki and Hiroshima. But the blast would damage the house beyond repair.

Governor Peterson says that because funds for shelter testing were limited, FCDA has not been able to test every kind of shelter for every geographical location. He said FCDA is well aware that in some areas of the

(Continued on page 49)

The Industrial Nurse

Editor
Rosamond J. Webster
R.N., A.M., Ph.D.

Going It Alone

THE worker who refuses to take advantage of the opportunities to have a chest x-ray, or who strongly objects "on principle" to an annual physical examination can be classified in simple terms, as a "go it alone" individual. The same tag can be applied to industrial nurses who insist on specific procedures, even to the discomfort and possible injury of the workers they are employed to serve. Such a nurse was the one whose inner sanctum, her office and first-aid room in a heavy industry, could not be violated, that is to say, entered until the push-button bell on her door was rung.

A classic example on a community-wide scale is a recent smallpox outbreak in an English town. In that country the citizen has the freedom to go unvaccinated and to keep his children from being given the benefit of this widely accepted public health measure. The result of this negative attitude in the Rockdale District was an outbreak of 145 cases of smallpox. Interestingly enough the outbreak brought a hurried request for vaccination, in which 19,609 were protected against this serious and occasionally fatal disease. The cherished freedom of "going it alone" was quickly surrendered.

Time and again the industrial nurse comes across instances in which neglect and even perversity are followed by serious medical and surgical situations. It might be useful to keep a record of these instances and relate them to the occasional obstreperous individual who refuses to follow medical advice; who neglects ordinary hygienic measures; and who sneers at suggestions regarding moderation in food, drinking, smoking and other habits.

Vocational Rehabilitation

THE increasingly older average age of our population presents various challenges to employers and the public. One problem is to use fully and effectively all those able to work and to rehabilitate those who have been injured or are otherwise physically handicapped.

The Vocational Rehabilitation Office points out that in 1951 the successful employment of 2,600 rehabilitated men and women with heart disease set a near record. The average age when the disability became evident was 17 years, and 26 years when vocational rehabilitation was started. At the beginning, 89 percent of these men and women were unemployed. Similar success was achieved in the rehabilitation and placement in productive employment of 5,700 men and women with hearing disabilities. Three out of five of these persons were out of work and practically all the others were in danger of losing their job or were in unsuitable work. The average age was 39, which falls within the years of most production and most serious family responsibilities. These are but two groups for whom much has been done—there are many others, especially those with orthopedic defects.

The handicapped or rehabilitated worker may require, for a time at least, the sympathetic understanding of at least one person professionally competent to understand his problems. Where an industrial personnel department accepts rehabilitated workers, the nurse can be the key person to help such individuals in making a satisfactory plant adjustment.

Some Facts

SEVERAL studies made on practices in industrial medicine departments provide interesting information.

The Federal Government promotes and aids in developing state and local industrial hygiene programs; develops methods to protect the health of workers through research and promotes the application of preventive and control practices in industry; stimulates, through state and local industrial hygiene agencies, the development of diagnostic, preventive, and referral services in industry to improve the general health of the worker; and provides consultation on prepayment plans available to the worker in the community.

Direct responsibility for protecting the health of workers rests with state and local agencies. These maintain cooperative working relations with other official agencies, and with industry, labor, professional

organizations and other non-official groups. These state and local agencies employ more than 400 professional persons, mainly physicians, nurses, engineers and chemists. The services they provide include the stimulation of development of health services in industry; channeling of public health programs into industry, environmental control of industrial health hazards; medical and/or nursing consultation services, especially the improvement of plant nursing services.

Where Nurses Are Needed

The total number of full-time nurses employed by industry in the United States and Territories was approximately 11,000 in 1950. Of these, 90.6 percent provided in-plant service; 2.7 percent provided home or visiting nurse service; 5.7 percent served in industrial hospitals; and 1.0 percent served in personnel departments.

Most of the industrial health services are concentrated in manufacturing industries, with few health programs in other major employment groups. In-plant service is found principally among the larger concerns. Probably less than 5 percent if the companies with fewer than 500 workers have such services. It has further been estimated that not more than 10 to 15 percent of the gainfully employed workers receive on-the-job health service.

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Accidents and Personality

IT HAS long been recognized that many accidents are due to personality factors. Various studies have found that a comparatively small percentage of workers are responsible for a large part of the accidents in a given plant. The term "accident-prones" has come to be applied to these workers. The personality factors responsible for numerous and repeated accidents are receiving more and more attention from safety personnel. In an interesting development in this connection, a large insurance company recently merged its occupational health and safety services in a new unit called the safety and occupational health bureau. The implication is that the company recognizes the greater and greater attention being paid to the physical and mental characteristics of workers whom the safety program is intended to reach.

Accidental injuries are often complex in their origins. Physical factors of sense-organ adjustment, strength and age may be involved. Environmental factors, such as lack of safety devices, poorly planned, constructed, or repaired work areas, mechanical defects in machinery and appliances, humidity and temperature, attitudes of supervisory personnel and other workers, time of day, and noise and distraction—all these can contribute to accidents.

Apart from, though not entirely independent of, these items is the personality of the worker. Many workers are able to carry out their tasks without succumbing to poor working conditions, difficult personal relationships, and numerous other pressures. Others, fortunately a small group, give evidence of cracking up psychologically at the least provocation, whether at work or away from it. It is the personalities of these workers that require special attention if they are to become valuable workers and happier people.

Noise and Health

A GROUP of army officers, concerned with environmental health engineering, report that tremendous interest in the problems of noise and noise control has been generated in the past several years. This is the result of the tremendous increase in sources of noise that has accompanied our increased industrial potential. Automobiles with more powerful engines, larger and more powerful equipment in industry, and the aviation industry's rise have all created new problems in the effects of sound on man. Public health implications include the specific health hazard problems; the economic aspects of control; and various side effects.

Studies made at Air Force installations on a large group of engine test cell operators show that removal of the worker from the offending sound area brought a gradual recovery of hearing. An individual who is

temporarily deafened by a noise in his occupation so as not to be able to understand speech or music, is considered to be deprived of the full use of his faculties, even though partial recovery occurs between the time he quits work and the time he reports again the following day. Complete recovery, if no permanent damage has taken place, requires from 18 to 24 hours.

It is hardly feasible for industry to make such adjustments and arrange for time off with full pay. Noise is inevitable in some industries. Whether or not it can be appreciably reduced is a matter for competent engineers to investigate and determine. The use of ear plugs and valves may be a partial answer. Noise interferes with sleep and rest, as well as with production and safety on the job. There is a definite relation between loud noise and psychosomatic conditions. All those in industry-management, supervisory, safety, medical and nursing capacities—who can do anything to reduce unnecessary noise will add materially to worker comfort, health and production.

Life Stress and Absenteeism

EVEN in the present period of high employment, absence has risen as high as 10 percent of total working time in some industries. It is well known that absence is affected by the sex of workers, with women showing a far higher absence rate than men. Absence is also affected by the age of employees, length of service, type of sick benefit plan in operation, compensability of ailments and administrative practices of employers. About 90 percent of all absences are caused by non-occupational ailments, of which the respiratory ailments come first and digestive disorders follow closely.

Especially among women employees, the so-called "nervous ailments," though few in number, contribute a disproportionate amount of time lost.

This matter of absenteeism presents a serious problem to a telephone company, which cannot shut down, reduce production, or make other adjustments to meet high absenteeism. An extensive study recently reported by the medical director of the New York Telephone Company and one of his associates, found that absences of 1,297 telephone operators throughout their working careers were primarily limited to a small proportion of the workers. This was true both in terms of total days and number of times absent. The same employees fell into the high absence and low absence groups throughout their employment by the company. Twenty women with a high absence rate, studied as a group, were discontented, unhappy, difficult to get along with, and difficult to supervise. A group of 20 women studied, who had a low absence rate, were seemingly contented, happy to get along with, and easy to supervise. The entire group of 1297 showed that general attitude and ability to get along with others had a positive correlation with attendance.

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Atomic Shelters ***(Cont'd from page 46)***

nation a home basement is the exception. If excavation for an underground, outdoor shelter is impracticable, or cannot be afforded by the householder, he urges that the immediate premises be surveyed—in keeping with previously published instructions—to determine the safest shelter area either in or outside the home. To meet the cost of construction, it is suggested that close neighbors may consider two-family shelters on a share-the-expense basis. Where local conditions make suggested types of shelter inapplicable, FCDA recommends that advice on the most feasible type of construction be obtained from local civil defense engineering services.

The FCDA has previously published these technical manuals on protective structures: TM 5–1, Shelter from Atomic Attack in Existing Buildings, Part I, Method for Determining Shelter Needs and Shelter Areas (February 1952); TM 5–2, Shelter from Atomic Attack in Existing Buildings, Part II, Improvement of Shelter Areas (May 1952); TM 5–3, Interim Guide for the Design of Buildings Exposed to Atomic Blast (June 1952); TM 5–4, Windowless Structures—A Study in Blast-Resistant Design (July 1952).

The new manual (TM 5–5) is being distributed in limited quantities to civil defense organizations in cities of 40,000 and more. It also may be purchased from the Superintendent of Documents, Government Printing Office, Washington 25, D.C. for 30 cents.

"SAFETY MAINTENANCE" Salutes a Safety Idea

Lift Aids Safety And Maintenance

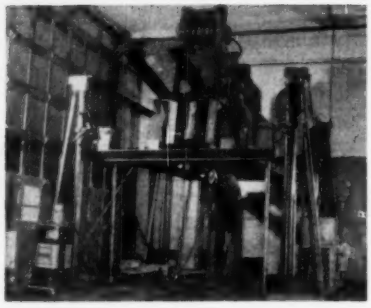
UNTIL a few months ago, one of the "Big Five" of machine tool producers, The Bullard Company, Bridgeport, Conn., found service and repair work to the undersides of fork trucks, plant tractors,

dump trucks, and platform trucks dangerous and slow. As shown in Fig. 1., even a man on a creeper was unable to get under the machines properly. This made it a great temptation to overlook hard-to-reach fittings in a lubrication job... and neglected parts led to breakdowns.

Recently The Bullard Company installed a self-contained elevating unit of 12,000 lbs. capacity, to facilitate servicing of such equipment. Now with a truck elevated on the lift, there are no hard-to-reach places and no neglect, as in Fig. 2.

Most of the work done on the lift is lubrication, averaging only one hour per machine; but the unit also speeds and simplifies such work as repairs and adjustments to steering, tightened running gear, pan removal and motor work, cutting time on some jobs to as little as 15 minutes.

Low ceiling height in this shop, limited the amount of lift possible, but the shallow platform structure of the unit gives adequate free space



under the machine as needed for the variety of equipment serviced. Also, the platform easily accomodates varying tread widths and lengths. Because it is a surface installation, it can be moved anywhere necessary in event of revision of the shop layout.

The elevating unit is available in electric-hydraulic or electric-mechanical models. Its many safety features insure maximum protection for the operator and equipment. Among these are pipe supports that drop into position when the platform is fully raised, making it impossible to accidentally drop the platform. There are also safety hooks on the platform that automatically engage all four posts when the platform is raised. They must be manually released before the platform can be lowered. An automatic safety switch cuts off motor power if cables or chains become slack for any reason.

Pictures by courtesy of Service Caster & Truck Corp.

National Rodeo Winner

IN defending his title as national champion straight truck driver, Perry H. Reid may have made the highest score ever tallied at the truck drivers National Rodeo, according to Director G. D. Sontheimer of Washington. Mr. Reid, a 33-year-old driver for Pilot Freight Carriers of Winston-Salem, N. C., scored 386 out of a possible 400 points. He bettered his 1952 title record by 18 points.

The competition, sponsored by the American Trucking Associations at Minnesota State Fair Grounds, was against the best drivers in the nation. The test included both written examinations and driving over a special obstacle course. Mr. Reid, a daily Winston-Salem-to-Statesville local run driver, has driven nearly 2,000 accident-free miles in three and one-half years.

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INSIDE THE TRADE

Ansul Board Elects

ANNOUNCEMENT is made of the election of A. J. Whitford, president of the First National Bank of Marinette, Wisc., as chairman of the board of Ansul Chemical Company, of Marinette. He succeeds Harvey V. Higley, who recently was appointed by President Eisenhower to serve as Director of the Veterans Administration. Mr. Higley will continue to serve Ansul as a director, without salary. The company is the pioneer producer of dry chemical fire equipment and also makes refrigerant and industrial chemicals.

Bullard on Research Committee

MR. E. W. Bullard, President of the E. D. Bullard Company, San Francisco manufacturers of Industrial Safety Equipment, has been appointed to the Research Committee of President Eisenhower's Committee on Occupational Safety, a Commission established to maintain a workable standard safety code in all U. S. Industry.

Mr. Bullard, who is the Deputy Chief of Civil Defense in San Francisco, and a member of the Governor's Safety Council, has been one of the nation's leaders in advocating safe practices in industry for the past thirty years. He organized the San Francisco Chapter of American Society of Safety Engineers, was a founder of the Veterans of Safety, and is presently Membership Chairman of this organization.

Solvent Firm Appoints

THE Pioneer Salt Company of Philadelphia, Pa. has been appointed as sales agents in Eastern Pennsylvania and South Jersey for the solvent products of the John B. Moore Corporation of Nutley, N. J. Western Canadian sales will be handled by Donner & Co. of Winnipeg, Manitoba. Co-incident with these new appointments, the company announces that sales in lower New York State and New York City will be handled by staff engineers under the general supervision of I. Q. Sarlin, process engineer for the company.

Dockson Appoints Sales Manager

THE Dockson Corporation, 3839 Wabash Avenue, Detroit, Michigan announces the appointment of Mr. J. M. Gray as National Sales Manager for both their Welding and Head and Eye Equipment Divisions. Mr. Gray has been associated with Dockson as Regional Sales Manager in the Midwest for the past ten years. His headquarters will be in Detroit, where he will also be Sales Manager for Dockson's Detroit retail outlet—The Sterling-Dockson Company.

Metscher Promoted by Hild

THE Hild Floor Machine Co. announces the appointment of Henry Metscher to the position of general manager. At a directors meeting, he was also elected to the office of Vice President.

Mr. Metscher has been associated with the Company for the past 15 years. He started as a salesman in the Greater New York area and was put in charge of the New York factory branch.

In 1950 he moved to Chicago and assumed the duties of Factory Superintendent. He assisted in developing the adjustable handle, the Models 115 and 155 HILD Vacuums, the All-Auto-Matik Upholstery Shampoo Machine and the new Model K and rug beaters.

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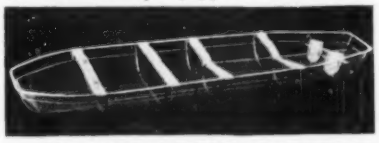
STRETCHER CASE

$23.80 FOB Louisville

YOUR PLANT NEEDS STRETCHERS

The Junkin Stretcher Case affords a convenient and compact cabinet for storing the army type stretcher, blankets and first aid equipment. It provides a definite location for the equipment and protects it against the deteriorating effects of dirt and grime. And because it's compact it's a SPACE SAVER tool Comes fully equipped if desired.



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Construction permits patient to be carried horizontally or lifted vertically without danger from inaccessible locations. Canvas straps and footrests keep patient rigid and comfortable. For complete information write for free descriptive literature.

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(Use Key # L-27 on Inquiry Card on page 69)

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(For further details, use Key # L-28 on free Inquiry Card on page 69)

The Fire Front

Electrical Problems In Mine Protection

OHM'S law does not always apply when measuring ground resistance for the safe operation of electrical equipment around coal mines, L. H. Harrison, of the U. S. Bureau of Mines, Birmingham, Ala., told the Middle Eastern District Meeting of the American Institute of Electrical Engineers.

"Because ground measurements made with commercial ground testers usually are read directly in Ohms, it is generally thought that Ohms' law can be applied. This is true only when the entire circuit is considered; even then it does not always hold true," he said.

"If a grounding electrode is measured and the probable current flow calculated, using the ohmic value indicated and the line voltage, the result is likely to be at great variance with the actual current."

Grounding Circuits

Mr. Harrison pointed out that "The flow of electric current in circuits through the earth is affected by reactive components, which must be considered in the accurate calculation of current flow or voltage drop in such circuits. Voltage drop and current values are affected by the frequency of the voltage applied and the measurement of ground impedence should be made with power of the same frequency as the power circuit or equipment involved in order to be rigorously correct."

Grounding circuits through earth strata, he warned, cannot be depended upon to blow a fuse or trip overcurrent devices installed for the protection of motors or other equipment, even though, the measured ohmic value of such currents is indicated.

"Knowledge of the electrical characteristics of the earth's surface is important in safe operation of electrical equipment. Such knowledge is helpful in the application of lighting protection to power systems; protection against shock hazards, and protection against premature blasting accidents where electrical shot firing is used."

Testing Manual for Insulation Resistance

A NEW 50-page manual on practical insulation resistance testing has been issued by Associated Research, Incorporated, 3758 West Belmont Avenue, Chicago 18, Illinois.

Designed around the use of insulation resistance testing instruments, the manual covers virtually the entire field of insulation resistance testing in a plain language, how-to-do-it style. Directions are given for testing many specific types of electrical equipment and systems; and the value of continuous record-keeping is discussed.

A free copy of the manual will be sent to all owners of the company's instruments who request it from the manufacturer, giving the model and serial number of their instrument. Copies are also available to other interested persons at fifty cents each.

August Fire Losses Reach All-Time High

ESTIMATED fire losses in the United States during August amounted to $107,713,000, according to the National Board of Fire Underwriters. Lewis A. Vincent, NBFU's general manager, said figure represents an increase of 90.8 per cent over losses of $56,462,000 reported for August, 1952, and an increase of 43.7 per cent over losses of $74,938,000 for July (1953).

Mr. Vincent explained that August's fire losses were the highest on record, reflecting the loss from the General Motors' fire on August 12.

Losses for the first eight months of 1953 now total $616,732,000, an increase of 17.9 per cent over the first eight months of 1952, when they amounted to $522,790,000. These estimated losses include an allowance for uninsured and unreported losses.

The National Board of Fire Underwriters also points out that fire losses in the United States for the third consecutive year are at an all-time dollar high and for the first time in history are expected to reach—if not break through—the billion dollar mark by the end of the calendar year.

According to Mr. Vincent, the nation's staggering fire losses are the result of over a million fires of all sizes—small ones in rubbish to the large spectacular fires that occur annually in the U. S. In addition, nearly half of them occur in the home. The loss of 11,000 lives annually as a result of fires, many of

which are due to carelessness, he said, makes it essential that everyone recognize the importance of ordinary safety measures.

The high level of fire losses is a drain on the resources of the country and must be controlled. The effectiveness of modern day fire protection and fire prevention methods is reflected in the fire loss record of the past half century. Large as the loss is, the current relationship between losses and property subject to damage points up the efficacy of the means now available to control this national fire waste.

One explanation for the continuing high trend is that various factors in the nation's economic life are responsible, among them rising prices, mounting production, and greater values exposed to fire.

Another explanation takes into consideration the nation's rise in population, the change in the purchasing power of the dollar, particularly in the last 10 years.

Viewed from either perspective, the National Board points out, the picture is not as somber as the stark figures would indicate—yet somber enough to cause grave concern to most Americans.

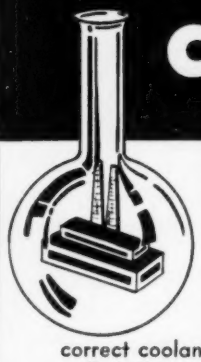
What are the causes of these million and more fires?

In the last 10 years, for instance, matches—smoking caused 25 per cent of all fires; misuse of electricity, 12 per cent; petroleum and its products, 9 per cent; stoves, furnaces, boilers and their pipes, 7 per cent.

Also, overheated or defective chimneys, flues and so forth, 6 per cent; ignition of hot grease, 4 per cent; hot ashes and coals—open fires, 3 per cent; open lights, 3 per cent; spontaneous ignition, 2 per cent; sparks on roof, 2 per cent; gas, 2 per cent; rubbish and litter, 2 per cent; sparks from machinery, 1 per cent; sparks arising from combustion, 1 per cent; explosion, 1 per cent, and miscellaneous causes, 4 per cent.

Other causes were exposures to fires originating off the premises, 8 per cent, and lightning, 8 per cent.

INDIVIDUAL
CUTTING OIL
SANITATION



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(For further details, use Key # L-29 on free Inquiry Card on page 69)

Drivers and Accidents

(Continued from page 37)

The primary means of cultivating attitudes among drivers which promote safety are those of *advising, instructing, and propagandizing.* Among the agencies which could assist in the work of promoting safe driver attitudes are:

1. The manufacturers of vehicles—through the inclusion of material in operating manuals and the use of paid advertising.

2. Distributors of vehicles—through direct mail pieces sent to the vehicle owner, emphasizing safety to the same extent that service facilities are promoted.

3. The licensing agency—through safety promotion material included with the form for renewal of permit for vehicle operation.

4. Insurance companies—through direct mail included with liability policies, promotion literature, and paid advertising.

5. Civic units—through the posting of signs and slogans and through enforcement, advisory, and instructional agencies.

6. Safety foundations and traffic, trucking, and transit associations—through movies and radio, and television programs.

7. Fleet owners—through the provision of both group and individual advisement and instruction.

8. Public conveyance operators—such as taxi, bus, and streetcar operators—through the same means used by fleet owners.

9. Schools—through driving instruction which includes instruction in the promotion of safe driving attitudes. (All school children should be given safety instruction to the same extent as health and hygiene instruction is now given.)

10. Newspapers—through news stories, editorial comment, and cartoon strips.

Closely related to the problem of promoting safe driver attitudes is the problem of appraisal and re-appraisal of vehicle operators with a view to determining their fitness for vehicle operation. It is highly important that licensing agencies make certain that permission to operate a

vehicle on highways and streets is granted only after a thoroughgoing evaluation of the qualifications of the applicant. Furthermore, operators should be re-appraised periodically; it is just as logical to require periodic re-appraisal of operators as it is to require periodic inspection of vehicles. Both the initial appraisal and re-appraisal of operators should include thorough testing and examination of the applicant along three lines: (1) physical capacities; (2) psychological factors of learning, attention, and observation; and (3) emotional responsiveness, emotional control, and basic attitudes toward safe vehicular operation.

I have indicated that through advisement, instruction, and propaganda, safe driving attitudes can be promoted. I have also indicated that there is serious need for careful appraisal and periodic re-appraisal of operators. But we need to go one step further. We need to know more about the fundamental nature of safe driver attitudes. This can be achieved only through research.

Such research should be sponsored, financed, and supported by the agencies previously mentioned as having responsibility for developing safe driver attitudes, namely, vehicle manufacturers and distributors, licensing agencies, insurance companies, civic units, safety foundations and associations, fleet owners, and public conveyance owners. Many of these organizations have sponsored research with reference to safety factors of the vehicle and the roadway. Unfortunately, however, there has been little research of a fundamental nature on driver characteristics, such as capacity, skill and knowledge, and attitudes. Such research as has been reported has frequently been immature and unimaginative. Stimulation must be given to the promotion of genuine human relations research in highway safety.

If we are to bring a halt to human massacre on the highway, which on a comparative basis results in higher fatalities than war, we must earnestly strive to bring about more satisfactory driver attitudes. To do this, we must find out more about driver attitudes and therefore seek ways and means of encouraging, on a far greater scale than has been done in the past, fundamental research into the psychological factors relating to the determination and correction of faulty driver attitudes and the cultivation of attitudes which promote highway safety.

Promotion of safety on the highway is not just anybody's job—it is everybody's job. Many agencies and individuals must work cooperatively to make safety promotion efforts effective. Furthermore, highway safety is not something that can be achieved one day and then forgotten or permitted to take care of itself the next.

From an address presented at the 7th Mayor's Highway Safety Conference.

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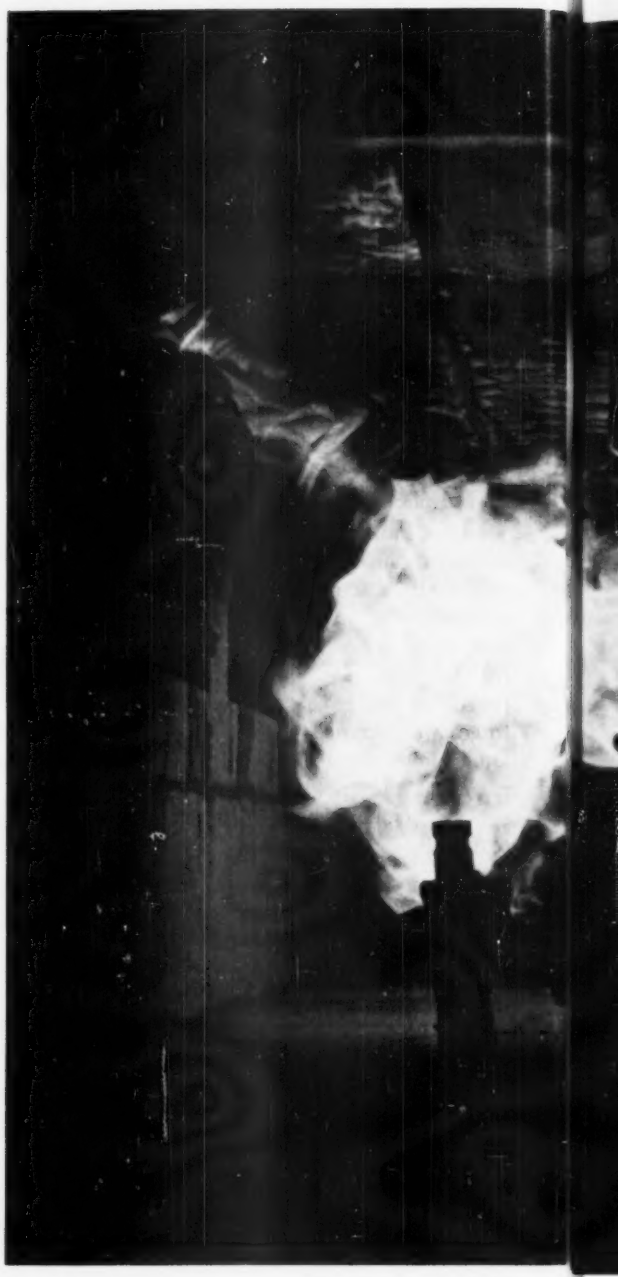
What Do You Mean... FIREPROOF?

By NORMAN H. DAVIS, JR.
Executive Engineer Underwriters' Laboratories, Inc.

FEATURE

Third of a feature series on Fire Protection. The next article will appear in the December issue.



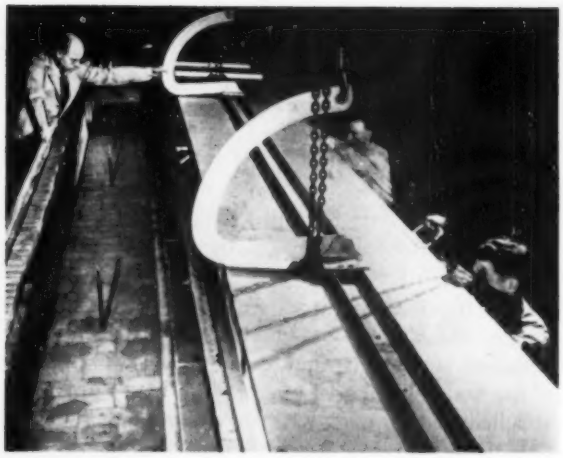
RIGHT—Roaring inferno is safely confined in fireproofing test furnace, as gas flames fiercely attack sample material overhead.

BELOW—Chemist checks draft in the furnace with anamometer.

THREE hundred guests staying at a big city hotel felt secure in the substantial looking building, with its sturdy steel frame and thick brick walls. Many of them had noticed that the hotel was advertised as "Absolutely Fireproof."

Just before dawn, many of these same guests were awakened by the smell of smoke and the crackling sound of flames. Fire swept through the hallways of the "absolutely fireproof" hotel, eating away the painted burlap and wallpaper which covered the walls, and the wooden trim. The flames swept into many rooms, greedily consuming furniture, drapes, and blinds.

Scores of people died within 3 hours in this inferno. But the shell of the building remained, structurally



Technicians prepare to swing removable side of furnace back into place for test. Material to be tested is attached to underside. Note fire brick lining and temperature indicating posts.

Engineer examines charred surface of test sample and checks depth to which flame has penetrated material in time test.

sound. Technically, it ***was*** a "fireproof" building. Fireproof as a stove.

The owners had forgotten that combustible furniture and trimmings in a well-constructed hotel burn just as rapidly as they do in a frame firetrap. The solid, fire-resistive building was filled with tons of fast-burning fuel.

As one fire prevention expert observed, using combustible materials within a concrete-and-steel building is as foolish as "stacking firewood in the lobby and then just hoping that nobody will light it accidentally."

Many of the worst fire tragedies in American hotels, apartment houses, and homes have been traced to this one cause—placing too many fast-burning furnishings and decorations in an otherwise firesafe building. Often other slower-burning materials could have been substituted easily—but contractors and builders had no complete charts to indicate which materials were safest and which were most hazardous.

A Positive Test

A unique furnace has been developed in the Chicago laboratories of Underwriters' Laboratories, Inc. to supply the information. Controlled fires in this furnace will help prevent thousands of fire deaths during the next few years, if builders and contractors apply the knowledge conscientiously and if citizens insist that

safety standards be observed.

Engineers at the laboratory developed this furnace after much study and experimentation. It is a steel shell lined with fire brick, and looks like a chimney laid out lengthwise along the floor of the laboratory. It is 25 feet long.

The furnace is quite simple in design. The topmost wall can be detached completely, and a sample of the building material to be tested attached to the underside of this wall. The sample is 20 inches wide and 25 feet long, enough material for a conclusive test of its burning speed.

The wall is then returned to its position, and the test begins. A gas-burner is lighted at one end of the furnace, and a breeze, regulated to blow 200 feet per minute, sweeps the flames of this burner the length of the furnace.

An engineer stands by with a stopwatch, and his assistants keep their eyes on several special instruments. They are looking for the answers to 3 questions:

How fast will this material burn?

How much smoke will it produce?

Will it help the rapid spread of flames to other materials?

The answers to these 3 questions will tell whether a certain material is suitable for future factories, hospitals, hotels and homes. If it burns too fast, the inherent danger is obvious. If it creates too much dense smoke, it could cause many deaths and would make it more difficult both for victims to escape and for firemen to fight the blaze. If it contributes much fuel to the fire, it will make any small fire bigger and any bad fire worse.

In order to assure accurate answers to these questions, conditions in the laboratory are very carefully controlled. The room temperature is held steady, and even the moisture content of the air is regulated. Slight changes in temperature or humidity can affect the speed with which materials burn.

In classifying the materials which have been tested, comparison is made with two common materials: asbestos cement board, and red oak wood.

Asbestos cement board does not burn so it is rated at "zero" in spread of flame, contribution of fuel to fire, and production of smoke. Red oak wood, which is a standard building material, is classified as "100" on the rating chart. Other materials are then rated by comparison with these two standard materials. Thus a material which receives a rating of "50" will burn its surface half as far as untreated red oak wood in the same time. A material listed at "200" would spread flames twice as rapidly as red oak wood. Paints and wall papers can be rated, as well as composition wall board, fabrics, papers, and insulating materials.

Wide Variety of Tests

One promising development of recent years has been the chemical treatment of materials to reduce their burning characteristics. The reliability of each of these treatments can now be determined by a standardized test. In the future, conscientious builders and contractors will be able to discover quickly whether certain materials will endanger lives. Home owners and building owners will be able to veto the use of quick-burning trimmings and decorations. Many manufacturers who have expended much money and effort in developing safer building materials will submit their new products for test and classification.

The furnace is merely one of the many ingenious devices especially designed by Underwriters' Laboratories' technicians to carry out various tests on a wide variety of products. Products tested range from roofing materials to floor wax, and from household fuses to complex machinery. One tireless machine in the New York laboratory twists electric iron cords 3000 times to be sure

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WELDING CURTAINS—SALVAGE COVERS
to confine the welding operation to a given area
used to protect machinery, and other equipment from water, dust and snow.

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"If It's Made of Canvas, We Make It"
(For further details, use Key # L-32 on free Inquiry Card on page 69)

they won't become dangerously worn from ordinary home use. Another pulls electrically-heated blankets back and forth over a framework thousands of times to make certain that they won't short circuit regardless of how restless the sleeper may be. Engineers in the laboratory examine such common household articles as the toaster, the fan, electric wires, and countless other pieces of equipment. They also test floor wax to make certain that it won't be dangerously slippery, and fire extinguishers to make sure they will work efficiently when needed.

Products and materials which pass the tests may then carry the words "Underwriters' Laboratories, Inc. Inspected," or the initials "UL" on the tag or name plate.

How the Lab Operates

Underwriters' Laboratories, Inc., started in 1894, is a nonprofit, self-supporting organization. It serves as the official testing station for the National Board of Fire Underwriters.

Any manufacturer can send devices to the Chicago, New York or San Francisco laboratory for testing. He pays the costs of running the tests on his products, including his share of salaries and overhead. He pays the same amount whether his product passes the test or not—the Laboratories have no financial interest in the outcome.

Sometimes manufacturers bring in early designs of a device to discover just what needs to be done to make it safe and to obtain the "UL" listing. Nearly half of all products tested fail to measure up to the high standards the first time. Many are improved by the manufacturer until considered safe by the engineers. More than 500,000 products have been found acceptable for listing.

The new furnace represents one more significant advance in the continuing battle against fire. Scientists are confident that a blaze in their laboratory furnace can prevent many future blazes in buildings, hotels and homes.

Pictures by courtesy of Underwriters' Laboratories, Inc.

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Non-slip grip on Stanzoils acts like sand on ice. Handles wet, oily objects as if dry. Speeds work—cuts accidents.
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QUALITY GLOVES FOR 35 YEARS
(For further details, use Key # L-33 on free Inquiry Card on page 69)

Switches (Cont'd from page 13)

position of a machine part, or sense the reading of a pressure gauge or temperature measuring device more accurately than humans, and they don't forget. Neither are they confused about what to do next. On some automobiles, a blinking light or whistle tells the driver to take off the hand brake before driving away. This is another example of the "nonforgetting" interlock.

The interlock switch not only protects the operator by jogging his memory; in some ways it thinks for him, as well as acting as his hands and eyes. It can make a machine refuse to run until everything is in order; it can stop a machine when something is wrong; it can compel things to be done in the right order. In these ways the interlock assures operator safety, equipment protection and product quality.

Electric interlocks and limit switches are in use on machines as different as juke boxes and automatic pilots. They are in automobile gear shifts and in dial telephone equipment. This success for so many purposes depends on the basic principles of switch operation and using the right switch for the right job.

Three Kinds of Switches

There are three general kinds of electric switches used in interlocks and limit work.

In longest use has been the simple contact type switch, which is moved without snap-action. Usually such contacts are mounted on leaf springs. Another form uses bars on the face of a cylinder which turns under fixed contacts or brushes. Their simplicity recommends such units, and they serve well to switch small amounts of power when precision is not required, and when there is plenty of operating force and motion. Picking up a telephone works such a switch.

When greater accuracy is needed, or more power must be controlled,

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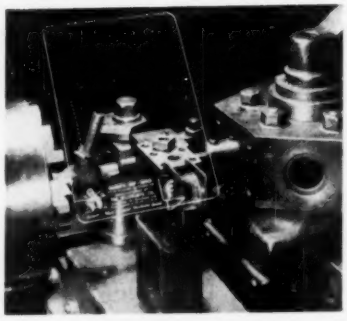
(Use Key # L-34 on Inquiry Card on page 69)

"You have to see danger in order to avoid it"



Just magnetically *grip* these handy . . . proven . . . tru-vision guards to any machine tool in your plant.

They stop the danger—at the source.

"It's a dilley"

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THE DILLEY MANUFACTURING CO.

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Refer to page 433—1952–53 Edition Best's Safety and Maintenance Directory

(Use Key # L-35 on Inquiry Card on page 69)

two newer switches are used. One is the mercury switch that fills certain needs. The other is the snap-acting switch which is widely used. Each kind has its place in actual use.

To cut off a water inlet at a certain level, washing machine engineers used a float which works a switch when water comes up to the right point. In deciding whether to use mercury or snap-action switches for the job the engineers studied both types for performance and cost. Mercury switches were selected because they are sealed and have rubberized wire sealed to them.

Two other switching jobs on a washing machine are best done by a single mercury switch. One switch action stops the machine whenever the cover is raised. For this safety stop the mercury tube simply tips with the cover so that the mercury runs from one end to the other when the cover is raised. The same switch also stops the machine if the agitator wobbles with an unbalanced load.

This double action of a single mercury switch, first in response to movement of its mount and second to a trigger release, shows the switch's adaptability. Where interlock with movement out of level is wanted, mercury switches should be considered. For use under difficult and wearing conditions, the mercury glass tube can be cast into a solid block of plastic inside a metal can. Installation is inexpensive and simple.

Mercury switches are highly reliable in conditions suited to their use. A mercury contact is new every time. Within its rating, it never fails to close the circuit and can never stick in closed circuit condition. Switches are vaporproof and can operate in corrosive or humid conditions.

Some things must be taken into account in installing mercury switches, however. Wire and insulation must be chosen to withstand the conditions of the job. Care must be taken to avoid short bends in the wire in order to provide long life. Of course, mercury switches won't work where motion or tipping will roll the mercury at the wrong time.

A mercury switch would not work on the table of a surface grinder which carries work back and forth under the grinding wheel. A snap-acting switch should be used here. It is mounted where the handle, which controls the magnetic chuck, turns the switch off when the chuck is de-energized. This stops the table and the wheel. It prevents the serious accident of having work driven off the table by coming under the wheel when it is not clamped under the chuck.

Another place to use a snap-action type of switch is on proofing presses. Paper is laid by hand on the type just ahead of fast-moving rollers. On a protected press, a bar ahead of the rollers carries a mechanical switch that instantly stops the press if a hand gets in the way.

Loading work into hand milling machines gets fingers close to dangerous cutters. A double-throw switch, mounted on the bed of the machine and operated as the table moves to the loading position, snaps from one position to the other, opening and closing the motor circuit to an electric brake which stops the cutter spin.

Some machines are turned over by hand with an "inching bar" during set up. If the bar is not taken out before the motor is started, it becomes a deadly missile. A switch, operated by a hinged guard over the inching shaft, prevents the motor starting until the bar is out.

Switches mounted on punch press dies do several kinds of jobs. One of the commonest is to feel the thickness of stock being fed and to stop the press before more than one thickness can reach the die and injure it. Switches can be so placed that pieces being put into drill jigs, forming dies, milling fixtures, etc., must be in exactly the right position before an operation can be started. Many of these jobs use the ability of precision switches to operate at the same point time after time. Some switches repeat within plus

or minus .0001 of an inch.

Another characteristic is built into some special switches along with repeatability—sensitivity to small operating motion. This ability is called close differential. Differential means the movement which will snap a switch back and forth from one position to the other. One widely used application is in thermostats and pressure controls. Movement of as little as .0003 of an inch opens and closes circuits on these devices.

Precision switches used in interlocking are listed by Underwriter's Laboratories to control electrical loads up to 20 amperes at potentials up to 440 volts a-c. This is more than the ordinary wall-switch will handle. Precision switches are small, however. No larger than the human thumb, they weigh one ounce and operate with .001 of an inch of motion. The force needed is but a few ounces. They outlast the wall-switch many times over. A subminiature style of switch is no bigger than the eraser on a lead pencil, and weighs 265 to the pound. It finds many uses where space is small. Compactness and ease of operation have much to do with many uses of switches. This is particularly true when a switch is added to existing equipment.

Switches in Interlocking

If the .001 of an inch of mechanical motion needed to actuate a precision switch can be obtained from a machine's action or from its operator, an interlock to protect the machine and the operator can successfully be built. This is true simply because motors or solenoids can turn the electrical power which the switch controls into mechanical action. Thus, the electrical precision switch, actuated by the slight pressure of .001 of an inch from the operator's hand or the machine's movement, operates the motor or solenoid, which in turn translates this controlled electric power into mechanical action.

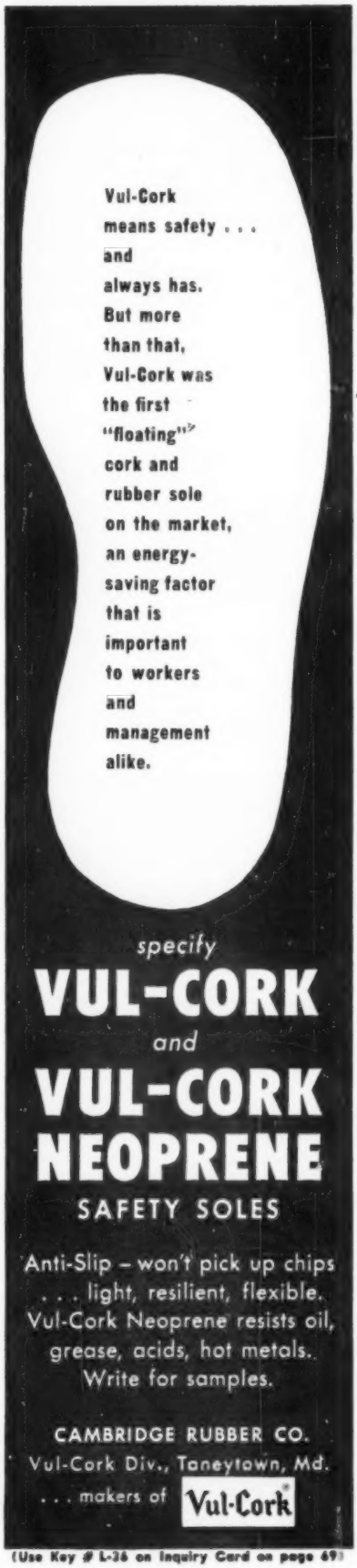
Solenoids are simply electromagnets which can produce a pull. A solenoid which opens or closes an electric switch is called a relay. In interlocking, relays find wide use as a type of remote control switch. For instance, although a precision switch sometimes operates a motor directly; it often operates a relay, which in turn operates the motor. Such a relay may be used in an electric trip for punch presses, air presses, metal-working brakes, paper cutters, leather producing machines, etc.

To illustrate, the operator might control the stroke of a press by moving two precision switches. These two switches then activate a relay which permits the clutch of the machine to be pulled so that the stroke may take place. Both hand switches must be worked at the same time or the relay will not allow the machine to operate. If for any reason the switches are operated too far apart in time, there is no stroke. The time within which both switches must be operated is adjustable to suit each job.

The hand switches are placed far enough from the danger area so hands can't get from switches to danger before the stroke is over. If hands are held on the switches longer than the time of a stroke, a switch operated by a moving part of the machine, prevents a second stroke until both hands are taken off and again put on the switches. On very large machines, each of several operators may have to have both hands on switches before a stroke can start. Reduced fatigue for the worker and increased production of this arrangement are typical results of interlock and limit switch operation.

Interlocks make the machine refuse to work if the operator makes a mistake, and trying to beat safety becomes only a mistake, not an injury. Operators also know that good interlocks "fail safe"; that is, if something goes wrong, such as a broken switch, disconnected or shorted wires, there will not be a false or unwanted stroke of the machine.

Choosing a switch for turning off the high voltage in a television cab-



(Use Key # L-36 on Inquiry Card on page 69)

inet when the back is opened will mean looking for a switch that is low in cost, easy to mount, and won't have to be positioned with great accuracy. The switch will not be operated many times and there is plenty of force and movement. To avoid the necessity of accurate positioning of the switch, choose a switch with overtravel built into it. Overtravel means that the operating plunger can move some distance beyond the point at which the switch snaps. The switch returns to its open circuit position when the plunger is released.

Another, slightly more complicated unit makes it convenient to turn on power intentionally while the back is off, but will give safety turn-off the next time the back is put on and again opened.

A quite different switch is required for mounting on a punch press to prevent feeding more than one sheet at a time. This switch must repeat operation at the same point time after time and must withstand vibration and impact.

A switch with still different characteristics would be best for mounting on the frame of a machine to sound an alarm when an overtravel on the frame springs it more than a certain amount. Here not only repeatability, but sensitivity to small operating motion is needed. Overtravel may not be needed or desired. For this use, a switch which will remain operated instead of self-returning may be chosen. The alarm will then remain on until someone resets the switch.

There are a number of basic switch characteristics from which to choose. In addition, basic switches are fitted with lever actuators or are placed in protective housings to give further variety to their response. Each combination has its use, and the job of selection is to choose the one which will require the least special gear.

This may make it sound complicated to pick the right switch. Much, however, can be learned from manufacturers catalogs, and dealers are helpful. Further assistance can be obtained from application engineers at the nearest branch office of a switch manufacturer.

Pictures by courtesy of Minneapolis-Honeywell Regulator Company.

From an address delivered at the 40th National Safety Congress.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, Etc., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912, OF SAFETY MAINTENANCE AND PRODUCTION, published monthly at Rensselaer, N. Y., for October 1, 1953.

State of New York, County of New York, ss. Before me, a Notary Public in and for the State and County aforesaid, personally appeared Arthur Snyder, who, having been duly sworn according to law, deposes and says that he is the business manager of SAFETY MAINTENANCE AND PRODUCTION, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management and circulation of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in Section 411, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor and business managers, respectively, are: Publisher, Alfred M. Best Co., Inc., Executive Offices, 75 Fulton St., New York, N. Y.; Editor-in-Chief, Alfred M. Best; Editor, Harry Armand; Managing Editor, C. M. Kellogg; Business Manager, Arthur Snyder, all of 75 Fulton Street, New York, N. Y.

2. That the owner is Alfred M. Best Company, Inc., 75 Fulton St., New York, N. Y.; and that the owners of 1% or more of the stock are:

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3. That the known bondholders, mortgagees and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages or other securities are: None.

4. That the two paragraphs next above giving the names of the owners, stockholders and securities holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company, but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees hold stock and securities in a capacity other than that of a bona fide ownership; and this affiant has no reason to believe that any other person, association or corporation has any interest, direct or indirect in the said stock, bonds or other securities than as so stated by him.

ARTHUR SNYDER,
Business Manager.

Sworn to and subscribed before me this 22nd day of September, 1953.

ELIZABETH BRENNER
Notary Public, State of New York
Qualified in Kings County
No. 24-0407700
Certificates filed with New York & Kings Reg. Offices & N. Y. Co. Clerk Office
Term expires March 30, 1955

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with WOODEN SOLES!
Wooden Soles Insulate
Strong steel toe
FOR THE FACTORY...
No. 504-S Sizes—5-13
Wear a Reece "Strong Toe." Comfortable leather uppers. High, roomy steel toe protector, heat-resistant wooden sole. Have comfort-safe feet at work in oil refineries, foundries, steel mills, factories.
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The Reece "Hot Foot" sandals. Protect your feet in furnace and coke oven rooms. Straps on over your own shoes. Heat resistant wooden sole, strong galvanized iron counter, flexible hinge toe.
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There is no substitute for Reece Wooden soles
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Columbus, Nebraska
(For further details, use Key # L-37 on free Inquiry Card on page 69)

What's New...

For your convenience in obtaining descriptive literature of products listed here, use the Reader's Inquiry Card. Just write in the code number given with each item. Or send written requests to:

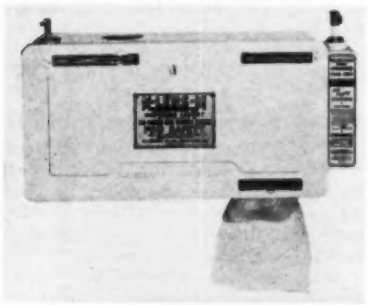
Service Dept.,
SAFETY MAINTENANCE & PRODUCTION

IMPROVED FACE SHIELDS

(Use Key # 859 on Inquiry Card on page 69)

THE American Optical Company announces a redesigning of their series F200 and F300 Face Shields to give 5/8" more clearance between the wearer's face and the window. This affords greater comfort to workers who must wear glasses or corrective goggles under face shields.

A new patented feature on AO face shields, floating snap fasteners, permits the window to expand under extreme heat without the possibility of cracking or curling. Different types and sizes of windows are replaceable and interchangeable on the same headgear; windows come in clear or green acetate in three sizes with a choice of three thicknesses.



REDESIGNED ANTI-FOG STATION

(Use Key # 860 on Inquiry Card on page 69)

A COLORFUL decal to encourage correct and more economical use of the K-LENS-M Anti-Fogging Liquid is a feature of the new Lens Cleaning Cabinet Attachment. Offered by the Wilkins Company, Inc., the new attachment was featured by the company in its exhibits at the 41st National Safety Congress and Exposition in Chicago. The simple directions for the proper use of the Anti-Fogging Liquid are in eye-catching, bright colors on the cabinet. The colorful decal is always before workers as they clean and treat safety goggles, face shields and all other types of eyewear. The station is an ingenious design, attaching easily to the regular K-LENS-M Cabinets, so the built-in lock on the cabinet door prevents piferage and tampering.

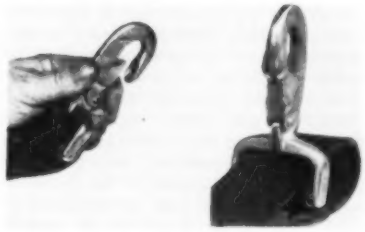
The K-LENS-M Anti-Fogging Station, used with the K-LENS-M Dispenser Cabinet provides a compact, complete, economical service. These are easily installed throughout the plant for convenience of workers to save loss of time. The complete unit is equipped for ready use with K-LENS-M Products: Lens Cleaner, Anti-Fogging Liquid, Lens Tissue, Spray pumps, Screws and Key.

MAINTENANCE LADDER

(Use Key # 861 on Inquiry Card on page 69)

EMPLOYING a radically new design, the Kant-Tip Ladder, made by the D. O. Kepler Co., permits workers to get close to wall and other areas to be serviced, because there are no cumbersome back legs to interfere. Instead, two short angle-legs extend only slightly beyond the plane of the top tread, but sufficiently far to prevent tipping of the ladder even when a topheavy load is applied.

The ladder is made from seasoned hard woods. All treads are braced and secured with bolts, steel rods and angle irons. The ladders are used by auto body repair shops, carpenters, electricians, painters, maintenance crews, machine repairmen, etc. It reduces the risks of working in awkward places by eliminating the need for reaching. The back legs fold away for compact transportation and storage.



NEW SAFETY SNAP

(Use Key # 862 on Inquiry Card on page 69)

THE new Miller Safety Snap, with two great life-saving features, was developed to give greater safety than ever before to linemen, window washers and others engaged in work requiring safety straps, by Miller Equipment Co. This Miller Snap completely eliminates the hazards of "ROLL-OUTS" and "HANG-UPS" without any special operations or extra gadgets. Tested and approved by field men, safety directors and insurance underwriters, the new Miller Safety Snap is now standard equipment on all Miller Safety Straps.

FIRE-RETARDANT FILLER FOR WOOD BLOCK FLOORS

(Use Key # 863 on Inquiry Card on page 69)

NOW available from Maintenance Engineering Co. a material to retard and prevent fires in industrial plants, warehouses, etc. where wood block floors are used. This material is also used for the protection of railroad ties, trestles, timber platforms and any timber surface exposed to sparks. The mastic seal, known as MECO "73," will not burn and the manufacturers claim when heated sufficiently the gases emitted tend to extinguish rather than feed flame.

In addition to its fire retarding qualities, it is oil and acid-proof, and will fill and seal the pores in wood block or other timber construction, preventing the block from absorbing oils and greases which tend to increase the fire hazard and inflammation of wood block floors or timber construction. It can be used for re-setting old and worn wood block, or filling and sealing the joints, or building up slight depressions in the surface of the wood block.

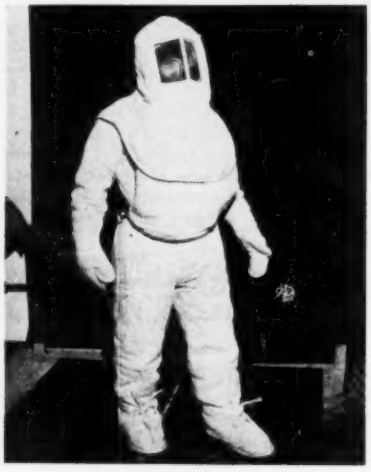
HEAT-RESISTANT COATING

(Use Key # 864 on Inquiry Card on page 69)

A NEW quick-drying material that can be sprayed like paint on metal making the treated surface capable of withstanding temperatures as high as 5000 degrees F. has been developed by The B. F. Goodrich Company. Called "Pyrolock," a one-sixteenth inch coating of the new insulation protects metal for as long as 10 seconds against flame temperatures hotter than the melting point of metals. A water base inorganic material, it was developed at the request of the Defense Department for use in the rocket and guided missile field.

Pyrolock is non-toxic, non-flammable, non-explosive and will adhere directly to clean metal surfaces without sandblasting or use of priming surface preparations. The dried layer bonds itself to metal with a strength that withstands sharp impact short of actual deformation of the base metal. Resistant to most solvents and chemicals, the material also withstands indefinitely temperature cycles of minus 60 degrees F. to plus 165 degrees F.

The present material can be easily modified for use anywhere where resistance to flame and high temperatures is needed. A modified version for broader use in industry would provide for adhesion to many types of surfaces, withstanding water, acids, alcohol and the affects of weather.



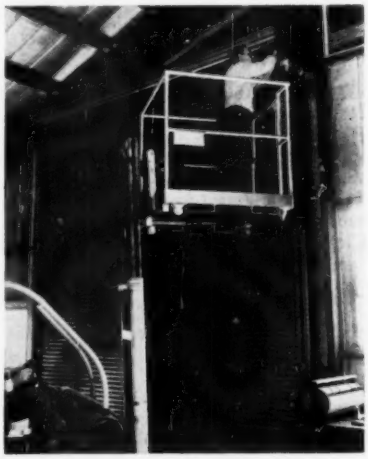
FIRE FIGHTER SUIT

(Use Key # 865 on Inquiry Card on page 69)

THE Quaker Safety Products & Manufacturing Company, who were awarded the only contract and made the Fire Fighter Suit developed by the United States Navy has now adapted the Navy developed suit for Industrial use.

This is a one-piece suit weighing only 26 pounds. The weight of the suit is carried from the shoulders by a suspender harness arrangement that frees the upper part of the suit from any drag and provides more freedom of movement. A Chemox Oxygen unit is carried on the outside in a separate pack made of the same construction as the suit. The suit can be used with or without the unit as necessity dictates. The Helmet is equipped with VyCor Glass panels, 97% pure silicon. These panels can be heated to over 2500 degrees and dropped into ice water without damage.

A companion light weight approach suit is also being offered. This suit also has the Vapor Barrier that has made the Navy developed suit so successful. The approach suit is not intended as an entrance suit but does afford ample protection should the wearer be caught in flames temporarily. The suits are being used on hot oven and similar jobs, as well as for fire fighting.



WORK PLATFORM FOR FORK TRUCK

(Use Key # 866 on Inquiry Card on page 69)

SOMETHING new and needed in the industrial field is the mobile HECO Safety Work Platform, made by Hamerslag Equipment Co. Used in conjunction with a fork lift truck, this latest addition to the HECO line provides immediate and easy work access at any fork lift elevation. There is no set-up or erection necessary, no scaffolding, no ladders. Ideal for construction work, industrial plants, machinery repair, shop maintenance, aircraft factories and countless other jobs.

Built according to standard California safety regulations, this platform has four-way fork entry, is 42" wide x 42" long x 42" high with a hinged gate at one side and has a chest-level safety railing all around. The floor is faced with a 4" toe plate and the entire unit is mounted on 3" rubber casters for easy-rolling when not in use. An all-metal, light weight, portable tool box, designed to fit the HECO Safety Work Platform may be obtained as an accessory.

Industrial team-mate of the HECO Safety Work Platform is the HECO Safety Work Stand. 42" wide x 42" long and 60" high with a welded steel ladder on one side, this addition is an all-day base for the work platform if necessary and leaves the fork truck free for other duties, returning only when it is necessary to move or raise the platform.

STEEL DRUM RACK

(Use Key # 867 on Inquiry Card on page 69)

A NEWLY-DESIGNED all-steel rack for ease and safety in handling heavy drums has been developed by Baker-Roos, Inc. The rack is designed so that one man can handle even a 750 lb. drum without strain or risk of injury. The rack is simple and easy to assemble; only a pair of pliers and a hammer are needed. Featuring a newly designed method of attachment, this rack is merely stood alongside drum, the two drum hooks are hooked over the top chime of the drum and the drum tilted into position. It is not necessary to tip the drum to insert clips under the drum before tilting into position. The rack has a handy telescoping steel handle to give added leverage and stability in handling. Four all-steel rollers are available as optional equipment and facilitate moving of drums from place to place. With the drum tilted into position, the contents may be drawn off as needed and can be drained to the last drop by simply tilting rack.

NEW RELEASE COATING ON BRADY SIGNS

(Use Key # 868 on Inquiry Card on page 69)

APPLYING the largest sizes of Brady Markers is now "child's play" through the use of new *Blue Streak* Release Coating on Brady Dispenser Cards, according to W. H. Brady Co., manufacturers of Self-Sticking Industrial Products.

A new word . . . A-B-H-E-S-I-V-E . . . has been coined to describe the new re-

lease coating. *Ab*hesive (the opposite of *ad*hesive) describes a formula that prevents or decreases the tendency of similar or different materials to stick to each other. The coating is supplied to the dispenser cards, covering an area the same as that covered by the marker on the card. The coating is rendered completely inert and has no effect whatsoever on any pressure sensitive adhesive.

Blue Streak's outstanding characteristic is that it permits instantaneous and *practically effortless* removal of the self-sticking products from the dispenser cards *without distortion.* Brady Wire Markers and Special Markers will now come on cards coated with Blue Streak. The fast, immediate removal of these widely used products from the card greatly reduces application time, especially important in production marking.

Other Brady Card-Mounted Products which will be equipped with the new *Blue Streak Ab*hesive as standard are Pipe & Conduit Markers, Safety Signs, Container Markers, Fluid Line Markers, Write-On-Labels, QUIK-MASKS and QUIK-SIGN Stencils. The manufacturer offers literature, a demonstration kit and free samples of the products in which you are interested. The Company also plans to make available the *Blue Streak Ab*hesive, coating machinery and techniques it has developed on a royalty basis to firms who have use for such a release agent in their products or processes.

INDUSTRIAL VACUUM CLEANER

(Use Key # 869 on Inquiry Card on page 69)

PRODUCTION of a new heavy duty portable vacuum cleaner for maintenance use in industrial plants, commercial buildings, schools, hotels and similar applications has been announced by Premier Co. Designated Model P-909, the new cleaner is equipped with a universal type a-c/d-c, 115 volt motor, sealed against water damage and fitted with a separate cooling system for continuous operation. It generates an air flow of 74 cubic feet per minute and a vacuum water lift of 42 inches. Dry tank capacity is 1¾ pecks; liquid capacity is 3¾ gallons.

A number of standard cleaning tool attachments are furnished with the unit, including an 8-foot braided rubber hose with adapter, steel floor rod for connecting tools to the hose, floor and rug nozzle, bare floor and wall brush, crevice tool, utility and upholstery nozzle and a slide-on brush. Also available is a kit of tools for conversion of the machine to wet-pickup equipment.

EXTINGUISHER CHECKING UNIT

(Use Key # 870 on Inquiry Card on page 69)

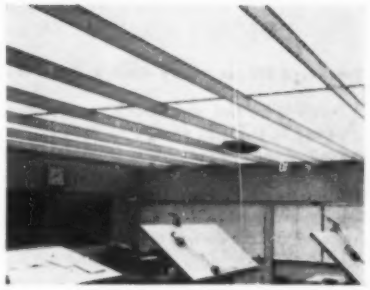
A NEW safety device now enables plant superintendents and safety engineers to check the weight of every carbon dioxide fire extinguisher in the plant quickly and effectively without removing the bottle from the wall to weigh it. Called the Silent Sentry, this compact, mechanical weighing device suspends the fire extinguisher and indicates the slightest change in weight due to leakage, sabotage, or partial use. A calibrated "look-slot" visible on each side of the red baked enamel case reveals at a glance the exact effectiveness of the bottle.

The Silent Sentry can be mounted to any vertical wall surface in a matter of minutes. A flanged collar clamp, furnished with the Sentry is permanently affixed to the neck of the extinguisher. This clamp hangs securely on the slotted yoke of the Sentry, yet permits instant removal of the extinguisher for emergency use. A safety seal is provided for protection against possible tampering or sabotage of the Sentry. It is available for 5, 10, 15 and 20-lb. carbon dioxide fire extinguishers. The national sales representatives, Am-Tel Equipment Company, are now appointing distributors throughout the country.

ACOUSTICAL LUMINOUS CEILING

(Use Key # 871 on Inquiry Card on page 69)

AN ENTIRELY new development in illumination and ceiling treatment is meeting with an enthusiastic reception as a solution to the problem of glare, noise and unsightly ceiling construction, according to Luminous Ceilings, Inc. "Acusti-Luminus" Ceiling diffuses the



room illumination over the entire ceiling area, giving it uniform distribution, eliminating shadows and reflected glare. At the same time, acoustical baffles, spaced at proper intervals, give the room a high degree of acoustical correction.

A translucent corrugated ceiling of thin vinyl plastic is suspended below continuous rows of fluorescent or slimline light sources, spaced for uniform diffusion. This plastic material comes in rolls three feet wide and is fastened to its supports at the ends, so it may be easily removed and rolled up in sections, to provide quick access to light fixtures, air conditioning ducts, or valves that may be above the ceiling.

The acoustical correction is provided by perforated steel baffles affixed to the channels holding the ceiling. These baffles contain fibre glass absorption pads. The ceiling may be installed either with or without these acoustical baffles.

LIGHT-WEIGHT WELDING GOGGLE

(Use Key # 872 on Inquiry Card on page 69)

THE development of a revolutionary welding goggle of unusual design and construction that gives the wearer complete spark protection, is unusually soft against the face, covers all prescription glasses comfortably, and may be raised with one hand, is announced by Dockson Corp.

Made of translucent plastic, the Dockson No. 50 Series Welding Goggle fits snugly and comfortably against any facial contour. Ample cross ventilation is provided by four vents—two top and two bottom. The large lens area gives the wearer greater visibility. Lens replacement is easily accomplished with Dockson push-out construction—no screws or other attachments.

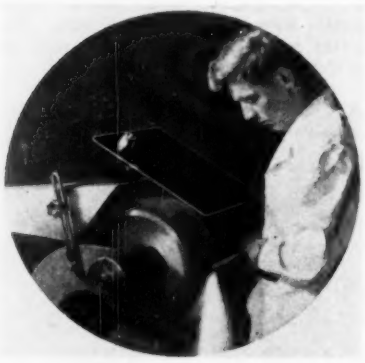
Both lenses are protected by acetate covers inside and out. These lens covers reduce pitting from sparks, and eliminate any danger from shattering. The lens holder is replaceable. Lenses are available with various shades of Federal Specification coloring.

HEAT GENERATING DE-ICING PELLETS

(Use Key # 873 on Inquiry Card on page 69)

A NEW-TYPE anhydrous substance called ICE-OFF, said to be 97% active for snow and ice removal, is announced by The Surface Protection Company, Inc. Made in dry pellet form, it is said to thaw snow and ice with 10 times the power of flake calcium chloride at 10° F. without the corrosive or bleaching action common to chlorides. ICE-OFF is free of insoluble residues and is harmless to vegetation, rubber, concrete and clothing.

For use on walks, drives, and steps around railway depots, industrial plants, commercial establishments, and institutions, ICE-OFF is simply applied by sprinkling the pellets on ice or snow. Internal generation of heat provides fast melting action. It may be applied at the beginning of a snow fall or freeze and will keep surfaces clean and ice-free for hours, and may also be used under the rear wheels of autos to supply traction. For home use, it is supplied in convenient 2-pound cartons with a spout for easy pouring. Bulk containers are available for commercial, industrial and institutional use.

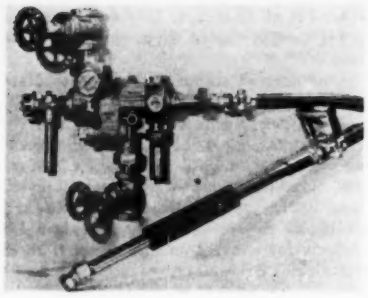


MAGNETIC EYE SHIELD

(Use Key # 874 on Inquiry Card on page 69)

THE Standard Portable Cord Co., Inc. has announced the development and production of a new type industrial protective shield. Called the "Magic-Eye" Shield, it is an inexpensive device to protect eyes, face and neck. The shield itself is made of ⅛ inch shatter-proof aircraft Plexiglas and is positioned with adjustable die-cast zinc clamps attached to the most powerful permanent magnet made—the Neoprene covered Alnico V Magnet, which is guaranteed for life. The Plexiglas is held by an aluminum swivel giving the "Magic-Eye" Shield completely universal positioning. Special brackets are also available for permanent attachment.

This new shield is already popular in the machine, tool, and allied industries for use on grinders, planers, lathes, presses, shapers, millers, saws, and boring mills. Its ruggedness has made possible its acceptance by steel mills, foundries, and welding shops.



STEAM CLEANER FOR LOW PRESSURE

(Use Key # 875 on Inquiry Card on page 69)

A RADICALLY new cleaning unit, the Sellers Booster Jet, now makes available to plants with low pressure steam facilities, the advantages of the hydraulic jet cleaning method. This is a unique means of propelling a solid jet of high pressured hot water and detergent for all heavy duty cleaning. The Booster Jet is designed to operate on ordinary cold water and plant steam of from 5 psi to 25 psi. It converts 5 psi inlet steam pressure to 100 psi discharge pressure. The increase ranges proportionately to 200 psi discharge pressure resulting from 25 psi inlet steam.

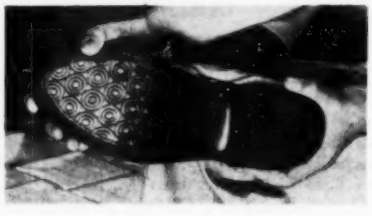
In all fields of general industry and food processing, where the Sellers Hi-Pressure Jet Cleaner has been used with pronounced success, there are large numbers of plants with insufficient steam to operate the standard units. The new Jet will accomplish, for these plants, a thorough clean-up in the least possible time. A solid stream of hot water, containing detergent up to 25% of the total volume, with temperatures of 160° to 210°, is propelled with controlled, cannon-like force. The resultant impact completely removes all dirt, grease and stubborn matter from walls, floors and equipment. Requiring no fuel or electricity, and producing no injurious fumes, the Booster Jet assures a safe and economical cleaning method for any size plant with less than 50 psi steam. It is made by Sellers Injector Corp.

NON-SLIP RUBBER

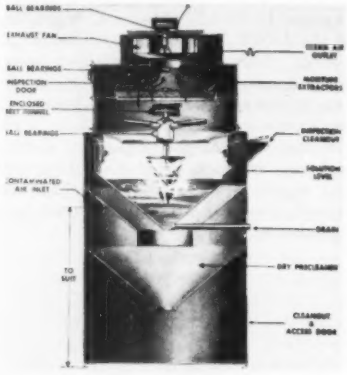
(Use Key # 876 on Inquiry Card on page 69)

FOR use on the decks of aircraft carriers, where a slip could mean death and oil and grease take a high toll of ordinary overshoes, the U. S. Navy has issued this Neoprene Safety Rubber with Tri-Vac Sole.

This new rubber is now available for industrial and civilian use in gas stations, oil refineries, chemical plants, creameries, paper mills, garages, etc. The squeegee action of the concentric suction cups prevents slipping. And the Dupont Neoprene outlasts several pairs of ordinary rubbers in the presence of oil, grease, acids, chemicals, solvents, etc.



Made by Tingley Rubber Corp., the rubber is molded in one piece with no fabric lining; is extremely light in weight (only 9 ounces) but tough. A big advantage to the retailer or plant purchasing agent is the rubber's great stretchability, allowing three sizes to fit virtually all shoes "small" for sizes 6 to 8, "medium" for 8 to 9½, and "large" for 9½ to 12. The satin-smooth interior slips on and off easily, can be turned inside out for thorough washing, yet elasticity of the Neoprene prevents the rubber from pulling off the heel accidentally. Also made in natural rubber for use in ordinary street wear for people who must guard against the hazards of slipping on wet or icy pavements.



VERTICAL DUST & FUME ELIMINATORS

(Use Key # 877 on Inquiry Card on page 69)

NEW Centri-Merge Vertical Rotor wet type dust and fume eliminators for industrial applications are now being manufactured by Schmeig Industries, Inc. Two unit types are being offered. One unit is used for wet collection and elimination only, while the other is a combination primary dry and secondary wet collection unit. The latter has a built-in dry type pre-cleaner for dry collection of heavier and most fine particles, and is particularly useful where material salvage is an operational requirement.

Both units combine the cyclonic principle of dust separation and positive high pressure water action to remove impurities from the air in a rotating torrent of water. For certain applications, other liquids than water may be used. Capacities range from 500 to 50,000 C.F.M. Advantages claimed for the units are: low ratio of power to rated capacity, high ratio of water circulated to air volume handled, an independently driven rotor and fan to permit adjustments to meet load and operating conditions, automatic liquid level control, self-acting skim-off of floating particles collected in the tank, collection and elimination functions not affected by water failure, and optional location of air inlet arm.

FREE BULLETINS & CATALOGS

As a convenience to executives, these new publications of manufacturers are offered by the Reader Service Department of SAFETY MAINTENANCE & PRODUCTION. To obtain copies write in the key numbers on the free-postage card below.

PERSONAL PROTECTION

Rubber Footwear 200
Beacon Falls Rubber Footwear. Rubbers to body boots are described in this 4-page, 2-color reprint from Best's Safety Directory. Featured is an insulated pac to protect against extreme cold. Flexible arches, safety toes, neoprene construction, long wear, and non-skid soles and heels are qualities emphasized in the entire line of footwear.

Leather Work Gloves 201
Kriewaldt Specialty Mfg. Co. The topic of this 1-page bulletin is a heavy leather glove for protecting welders and other workers in dangerous hand jobs. Available in several styles, the glove has a one piece back and all exposed seams are welted.

Safety Goggles 202
Willson Products, Inc. The goggles detailed in this 2-color, 1-page bulletin are designed to fit over standard prescription lenses. Eye-cups are molded of light-weight nylon and are non-flammable. Ventilation and ease of lens replacement are stressed.

Sweat-resistant Insoles 203
Hy-Test Safety Shoes. Sweat-resistant leather insoles, a feature of the company's line of safety shoes, are discussed in this 4-page, 2-color bulletin. The soles are said to outlast regular leather insoles 2 to 1.

Lineman's Gloves 204
The Surety Rubber Co. Straight or curved hand shapes, regular or turn-cuff styles are available in the lineman gloves covered in this 2-page brochure. Uniform quality and electric resistance are given important positions in the description of the gloves. Specifications and illustrations are included.

HEALTH PROTECTION

Hearing Protection 205
Stonehouse Signs, Inc. Noise is attacked from two angles in this 4-page, 2-color bulletin. Signs to warn the employee against entering a noisy area without ear protection, and a protective hearing device which fits into the ear are both covered.

Improved Vision 206
American Optical Co. A plan for checking and improving employees' vision on company wide scale is advanced in this 24-page, 2-color booklet. Key device in the plan is a sight-screener which tests 7 visual functions. Consulting service, goggle service, and necessary forms and records are provided by the eye-safety company.

FLOORING MAINTENANCE

Industrial Cleaner 207
Huntington Laboratories, Inc. A cleanser, recommended for cleaning metal, rubber, plastic, wood or "even the human body," is the subject of this 6-page folder. Given prominence in the 3-color folder is the composition of the cleaner—soap, detergent, water softener, emulsifier, and concentration.

Floor Resurfacer 208
The Monroe Company, Inc. A 4-page, 2-color technical data bulletin describes a floor repair and resurfacing compound. Chief emphasis in the literature is laid on a new prismatic crystalline mineral added to the resurfacer to form an unusually hard, resilient, non-skid surface.

Surface Cleaner 209
Abco, Inc. The cleaning, disinfecting, deodorizing, and sanitizing action in one application of a surface cleaner is detailed in this 4-page, 2-color bulletin. The cleaner contains a brightening agent and can also be used as a wax remover. It is said to be economical as well as rapid and easy to apply.

Floor Surface Material 210
Flash-Stone Co., Inc. This 8-page, illustrated, 2-color booklet explains the advantages of a flooring material of limestone-asphalt. Combined with rubber the asphalt-limestone pellets can be rolled quickly and lastingly into a flooring surface, according to the booklet.

Masonry Coatings 211
The Bakelite Co. Advantages, varied applications, and results of actual service tests are presented in this 8-page brochure. Illustrations show the coating being applied by various methods to concrete, stucco, cinder block, brick, plaster and porcelain surfaces. Basis of the coatings are vinyl and phenol resins.

MATERIALS—HANDLING

Sling Chain Use 212
American Chain & Cable Co. The reasons for sling chain failure are presented in this 4-page, 2-color folder. Tables and illustrations explain how overloading, bad hook-up, careless handling, angular pull, impact loadings, and wear, abrasions and distortion affect the life of chains.

Handling Problems 213
Lewis-Shepard Products, Inc. Twelve answers to 12 varieties of materials handling problems are given in this 16-page bulletin. Problems range from higher lift in narrow aisles to "upstairs" and drum handling. Each answer is illustrated and detailed.

Stacking System 214
Phillips Mine & Mill Supply Co. A coordinated system of stacking loads for storing or transporting materials is presented in this 3-page, 2-color brochure. A skid unit, a rigid materials-handling box, a collapsible small-parts box, and a pallet which can be used for different purposes are illustrated and described.

Stock Racks 215
The Brown Engineering Co. This 4-page, 2-color folder discusses sectional arm-racks, designed to save storage space, which give easy access to bars, rods, strip, tubing, pipe, conduit, shafting and other types of metalworking stock. Variety, visibility, flexibility, and long life are among listed advantages.

Walk-Ride Tractor 216
The Moto-Truc Co. A tractor, designed to permit the operator to ride or walk while still retaining control of his vehicle, is the subject of this 2-page, 2-color bulletin. A short wheel-base and steering handle makes maneuvering in close quarters easy, the bulletin states.

Bag-Handling 217
Elwell-Parker Electric Co. This 8-page, 2-color literature explains the handling of bags in plants through all processes. Advantages and economies are discussed and illustrated. Planning flow of bagged goods and more effective storage practices are included.

Mobile Loading Ramp 218
Magline Inc. This 4-page, 2-color bulletin describes in detail the company's line of 8 standard lightweight ramps of magnesium. The ramps are said to be suitable for moving by one man, and are specifically designed for loading and unloading yard cars, highway trucks, etc.

BUILDING MAINTENANCE

Lamp Disposal Unit 219
Laduby Company, Inc. A disposal unit for fluorescent burned out lights is dealt with in this 2-page bulletin. The unit grinds lamps to pieces under water; than they are removed, in a bag or basket, to be placed in the trash pile. The unit is said to be portable, taking up little floor space.

Mechanical Defect Detector 220
Anco Instrument Div., American Name Plate & Mfg. Co. Explanation of how this detector locates and diagnoses mechanical troubles, the detector's specifications and applications and illustration of the detector in use fill this 4-page booklet. The separate parts of the instrument are dealt with in diagram form.

Door Operator 221
Schoelkopf Mfg. Co. An electrically-operated, air pressure device, the subject of this 4-page, 2-color bulletin operates many different kinds of doors. Features are the safety, simplicity, quietness, speed and dependability with which the

(Continued on the next page)

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device operates. Drawings and illustrations add to explanation of text.

Steel-panel Scaffolding 222

American Universal of Ohio, Inc. This 4-page, 2-color folder deals with a metal scaffolding for easy assembly and disassembly. Pictures and drawings illustrate typical installations, safety features, and manner of assembly. Advantages listed are low cost, no nuts or bolts, one-man assembly, swivel action and versatility.

Demountable Scaffolding 223

Waco Manufacturing Co. A scaffolding frame which can be taken apart to go through extremely small openings and be used for special applications, such as scaffolding rigged inside a tank or water tower, is described and illustrated in this 1-page bulletin. Besides flexibility, the scaffolding features cross-bracing, built-in locks,

Plumber's Furnace 224

Insto-Gas Corp. A propane burning, portable furnace for plumbers and maintenance men is the central topic of this literature. Various attachments, including a floor furnace, a large furnace to hold 200 pounds of molten metal, a torch for sweating copper pipe fittings, and soldering irons with a soldering iron heater. Advantages listed are safety, controlled heat, portability and economy.

Guard-Rail 225

Armco Drainage & Metal Products, Inc. This 6-page circular shows in pictures and words how metal rail protects dangerous areas in plants. Dimensional drawing shows how the guard rail is assembled. Low-cost maintenance, efficiency, and simple installation are covered.

Tarpaulins 226

Canton Containers, Inc. Transparent, multi-purpose tarpaulins are the topic of this 1-page, 2-color bulletin. Designed to protect machinery, raw materials, factory areas and all types of goods during maintenance work, the tarpaulins are shrink proof, water proof and light weight.

FIRE PROTECTION

Static Control Systems 227

The John Hewson Co. Illustrations and diagrams combined with actual problem solutions in this 4-page folder, help explain the use of static control systems, alarm systems, and high voltage test sets. Central focus of the folder is the instrument which, with attachments, protects hazardous static areas.

LPG Odorization 228

J. B. Calva & Co. Covered in detail in this 8-page bulletin, with diagrams and charts as well as text, is a new method for odorizing liquid petroleum gas. Odorization takes place in the vapor stage of the fuel. The bulletin also shows how existing units can be modified to use the new process.

Fire-Pump 229

D. B. Smith & Co. A 16-page, multi-colored bulletin pictures and explains the use of a hand fire-pump, that can be carried on the back. Designed for small fires, especially farm and outdoor fires, the pump shoots a 40-foot stream of water. Air-cooled, it is said to be comfortable for the user.

Fire Partition 230

Virginia Metal Products Corp. Detailed drawings and descriptions of a UL test on this movable steel one-hour fire partition are the heart of this 4-page brochure. The partition is designed to protect factories, labs, schools and other buildings.

Drum Transfer Pump 231

The Protectoseal Co. This pump, discussed and illustrated in a 2-page, 2-color bulletin, is designed to transfer flammable liquids safely from one container to the other. It is light in weight and easily attached, according to the bulletin.

Dry-type Transformers 232

Hindle Transformer Co. Four types of dry transformers, insulated for class B and C fires, are presented in this 8-page, 2-color catalog. Protected against weather conditions, the transformers are called convenient, economical and safe. Uses are listed.

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